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A PHILOSOPHY IN OUTLINE

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IN CONNECTION WITH

PSYCHE

A QUARTERLY JOURNAL OF GENERAL AND
 APPLIED PSYCHOLOGY

A PHILOSOPHY IN OUTLINE

BY

E. S. BENNETT

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CONTENTS

FOREWORD	7
THE PROBLEM OF	
CONSCIOUSNESS	11
REALITY	21
EXPERIENCE	28
PSYCHOLOGY	36
LIFE	53
GOD	60
AESTHETICS	66
CONDUCT	74
LOVE	87
POLITY	94
LOGIC	108
THE OCCULT	123
APPENDIX	133
SOME FURTHER DEFINITIONS	150

FOREWORD

This attempt at a lightning exposé of the essentials of philosophy was not drawn up originally with a view to publication. Its principal object was to explore the possibility of providing for the assistance of any friend of mine who might be sufficiently interested though without having read philosophy as a subject of study or being able to spare the time to do so, the skeleton of a philosophy compressed into a small compass, but which I should be at his service to explain, expand, or discuss with him as he might desire.

If there is any doctrine the desire to break a lance for which emboldens me to respond to the encouragement of my excellent friend Mr. I. A. Richards and publish these notes, it is the idea of the right of the amateur, nay, of everybody, to own a philosophy. Far be it from me to assert that I am a philosopher, for by that term I understand, not merely the owner of a philosophy, but a person who has

A PHILOSOPHY IN OUTLINE

made a special study of the errors into which men are liable to fall in the field of philosophical inquiry, and the most effective ways of correcting them. For that most laudable and useful purpose no study of the existing literature of philosophy can be too profound. The writer is a plain unsophisticated Civil Servant of the Crown. What he seeks to combat is the attitude of mind explicitly stated by at least two of the learned teachers at whose feet he enjoyed the privilege—and no mean one—of sitting in days now long gone by. According to these gentlemen (*a*) it was worse than useless for an ordinary person to attempt any philosophical thinking unless he should have first made himself broadly conversant with the history of philosophy, and (*b*) the ordinary person would find it quite impossible to make up his mind even then.

Once, years of effort were flung away in the quest of perpetual motion, which waste might have been avoided by a modicum of judicious instruction in the principles of physics. My conviction is that the principles of metaphysics and.

FOREWORD

logic will eventually form part of the universal school curriculum, where they will in the same way serve as a preventive inoculation and save the young from unprofitable expenditure of time. In these pages I have attempted to suggest, as regards its content, a minimum dose of what I believe to be incontrovertible philosophical truth such as might be suitable for teaching in all schools, and even at a fairly early stage, but, realizing that many more books must be written before the goal can be reached, I have assumed an ordinary adult education, leaving to other pens the work of rendering the matter into a form specially adapted for child readers.

The bulk of this little book was written in 1924 and remains practically in its original form. The section on Logic was finished early in 1925. In 1928 the sections on the Occult and on Love were added, that on Aesthetics was expanded somewhat and a few minor alterations made elsewhere. In 1929 an addition was made to the Polity section and the Appendix partly recast.

A PHILOSOPHY IN OUTLINE

I doubt if author can ever have sent book to press with a more acute sense of inadequacy and imperfection than in this case, and the inquirer who pays me the compliment of his attention may be assured that the shortcomings he will find are regretted by no one more than by

E. S. BENNETT.

Peiping,
China.

December, 1929.

I

THE PROBLEM OF CONSCIOUSNESS

Consider the sensations derived from looking at a white card against a dark background. Here we have confronting us the fact that two concrete things whose existences are in one sense independent of one another, namely the sensation of white and that of darkness, are yet in another way intimately associated in a peculiar but well-known manner which we may call for the moment a relation X. A relation X is any such relation that the entities between which it obtains, while they retain their distinctness as separate entities, nevertheless form parts of a whole which is conceivably capable of behaving in a manner having as its determining factors the entire body composed of all the characteristics of both entities ; this differs from a mere resultant effect or other such function of the two entities concerned in that from a complete knowledge of the behaviour in question the complete natures

A PHILOSOPHY IN QUITTING

of both entities is theoretically deducible, as well as the complete nature of the whole into which they are united by the relation X. By behaviour is here meant everything that a thing does, which includes everything that it is known to *be*, inasmuch as *causing such and such questions to be answered in such and such a way* may be included among the things a thing can be regarded as *doing*.

The most obvious relation X for physical objects is perhaps simple juxtaposition, all objects having, by assumptions (that real, and not fictitious, objects are referred to, and that the universe is one) which may for the present be made, their own fixed places in the framework of the universe. If we say that two stones are side by side, we mean that they occupy contiguous places in a tissue of related objects which includes an element, the ground, or rather the earth, regarded as common to all experience. In the case of sensations it is harder to define the relation of juxtaposition, because there is no element recognised as common to all sensations of all individuals in the same

PROBLEM OF CONSCIOUSNESS

way as the external universe may be said to be common to all material objects which would render it possible to speak of a sensation as simply *existing*, and as having such and such a position in the world of sensations. Hence arose the conception of "consciousness", which is an abstraction, representing the activity of the organism in co-ordinating the various impressions received through the organ of sense. That is to say, "I am conscious of a spot of white against a dark background" is another way of saying "There is a spot of white surrounded by darkness, and this, with other things of the same kind would form a series (my presentations) which it is convenient to suppose connected in a certain way only partially understood with the behaviour of a certain conceptual physical organism, myself, the convenience consisting in the fact that the series would then form part of a perfectly orderly, though highly complicated, scheme of things embracing everything I know anything about'

Now in considering such contrasted sensations as that of white against that of

A PHILOSOPHY IN OUTLINE

black, we have before us the fundamental problem of metaphysics. Whether (a) we think of the presentation as a sensation of black and a sensation of white with a mind assigning to the white its place in the middle of the black, (b) as a patch of white sense-stuff objectively situated in the middle of the black, or, (c) as a case of the mind entertaining the thought of a white patch in the middle of the black, seems after all but a perpetual game of musical chairs. It is the problem of the many which are yet one—and it is involved in the lowest cases of consciousness just as much as in the highest.

What is it that at bottom constitutes the difference between the sensations of white and that of black? The question asks itself because the modern mind shrinks from ultimate substance, seeking refuge from atoms in electrons, from electrons in ether vortices, and from ether vortices in mere distortions of empty space. Moreover the popular reply that the psychological character of a colour sensation is ultimate and simple is not easy to reconcile with the well-known fact that each such sensation

PROBLEM OF CONSCIOUSNESS

has its definite place in a three-dimensional series, that is, it has three qualities, brightness, purity and hue, each of which may vary independently of the others. It sounds rather like a contradiction in terms to say that a thing which is of the nature of a concrete mathematical particle having no structure can yet vary in three distinct ways, and one is fain to make one's escape by a criticism of the introspective method. If I close my eyes and move my hand about, or allow someone else to move it for me, I still know with tolerable accuracy where my hand is; for example, I can tell when my outstretched forefinger is near the tip of my nose. This knowledge must be derived from sensations, but all my attempts by introspection to study the quality of the sensation involved as I can study a colour sensation, meet with signal failure, because, it would appear, for one thing, I have no power of directing my attention to sensations of the kind in question, as I have in the case of colour sensations. Again, there is a complex mass of sensation material involved in the experience

A PHILOSOPHY IN OUTLINE

of speaking and eating of which we usually take no notice, and the smallness of the extent to which we can at times by careful concentration, distinguish and describe some parts of the mass only serves to show how very little we can really be said to *know* even about the content of our immediate mental experience. It is therefore not unnatural to suppose that in a similar way the sensations of colour may not be simple at all and that the differences between them may really be differences of texture, such power as we do possess of distinguishing between them arising merely from some circumstance such as the traversing by the currents of nerve energy corresponding to different colour sensations of different parts of the brain. However, these speculations bring us no nearer the solution of the problem for, even could we apply as it were a microscope to our sensations and ascertain for example that the sensation of black consisted in the last analysis of minute gray squares while that of white consisted similarly of minute grey circles, the question would merely have resolved

PROBLEM OF CONSCIOUSNESS

itself into one as to wherein the fundamental difference lay between the colour and the squares or circles and the non-colour of the interstices between them.

Turning now to the question of space relations, the difficulty is *not* to understand how we come to "refer" the sensations to the position in space actually occupied by the objects, instead of to the retina, or to somewhere in the brain where we may suppose "mind" to step in; for we may think of physical space as a fine network which may from the physical point of view be bunched up or distorted to an unlimited extent, all that matters being that the relations between points in the network corresponding to given points in the "external" physical world should be *analogous in all that regards the perceiving sensorium* to those between the physical points to which they correspond. That is to say, if three objects are equidistant, the images of these three objects in the psychical presentation will be separated by equal numbers of meshes of the net.

(The space of mathematics may be

A PHILOSOPHY IN OUTLINE

conceived in something like the following way. Let a series of things, $A_1, A_2, A_3 \dots$ be connected by relations of any sort fulfilling the definition that the relation of A_1 to A_2 is similar to that of A_2 to A_3 and so on, but to no other relations between points of the series. Now let each of these points $A(n)$ belong to a similarly constituted series $1A(n), 2A(n), 3A(n) \dots$. Then if a series of points of which the general formula is $(m)A(n), (m+a)A(n+b), (m+2a)A(n+2b) \dots$ be defined as collinear, and the distance between $(m)A(n)$ and $(m+pa)A(n+qb)$ as the square root of $(pa)^2 + (qb)^2$, we have only to increase to infinity the numbers of the points in our "straight lines" to arrive at the Euclidean plane, and by extending the process a step further, at Euclidean space.)

What is in common parlance known as the real world, the world of affairs and of most kinds of scientific research, albeit arrived at by a process of inference from our sense experience, is nevertheless nothing more than a certain complicated

PROBLEM OF CONSCIOUSNESS

mathematical figure of which—during waking life—a minute portion has a certain rough correspondence with the *shapes* of things in our sense presentation. Now mathematical figures are entirely abstract. Consideration of them can tell us only what results would follow *supposing* such and such points are regarded as connected by relations concerning which such and such things are true. The parts of our sense presentation on the other hand *are* connected and it is here that the difficulty lies. Between them there obtain concrete relations which thrust themselves upon us, refusing to be other than they are. There are not merely a white card *and* a dark space; the card is for our vision *in* the space. Were it otherwise there could be no consciousness, no knowing-together.

Thus, both substance and relation, the fundamental constituents of absolute reality are mysteries insoluble by any systematical scientific technique because science knows things only in terms of mathematical abstractions. She is concerned only with the relative position, not with the intrinsic nature, of the point-

A PHILOSOPHY IN OUTLINE

event, and of its position only in a system of relations which are themselves as insubstantial as the point-events they connect.

II

THE PROBLEM OF REALITY

So accustomed is the modern mind to scientific explanation of things by analysis of their structure that great difficulty is experienced in admitting even the possibility of absolute reality if once it is steadily thought about. For example, it is hard to resist the temptation to inquire how many kinds of ultimate substance are possible and that is equally true whether we (a) hold the primary colour sensations to be simple, and ultimate, or (b) regard them as probably compounded of elements more fundamental still ; on the other hand it is hard, whatever be the picture we sketch for ourselves of ultimate reality, to avoid doubting that it is really absolute, and not merely the surface of something we should understand more fully could we but look below and see the works. Of course any sort of "works" that we could think of as lying behind the scenes would necessarily only reproduce the problem.

A PHILOSOPHY IN OUTLINE

in other terms without bringing us any nearer to its solution, and we may therefore set our teeth resignedly and refuse to inquire, accepting simply as an axiom that absolute reality has two ingredients, concrete substance and concrete relations. (By concrete I mean: which has self-contained existence, not necessarily admitting of analysis or definition by exposition of connotation. Thus, concrete relations are to be contrasted with abstract relations, which may consist of mere facts concerning the things related, similarities, differences, etc. As to the relations between real point-events in physical space and time, it would be committing ourselves too far in matters not obvious were we to assert that they *are* concrete relations, but they clearly imply the existence of concrete relations of *some* sort.)

Now, even in the simple presentation of the white card against the dark background we have a number of white elements in juxtaposition in one place and a number of dark elements in another, whereas element by element, if taken as

PROBLEM OF REALITY

ultimate, might just as easily have been any other of all the kinds of sensation possible in the nature of things, and hence the arrangement might *a priori* have been expected to be quite a chaotic and disorderly one. If I consider, not merely my sense-presentation at any given moment, but the entire world which, legitimately or otherwise, I am fain to regard as known to me through and by reason of the whole succession of these presentations taken together, the already formidable *a priori* improbability of the arrangement I am led to infer immediately mounts into a vastly higher order of magnitude. For, instead of a two-dimensional field of limited extent, and demonstrably by no means infinitely divisible, there is now a world in three dimensions and time, which up to the very confines of astronomical space shows a rigid orderliness to which apparently no single electron ever fails to conform.

So long, indeed, as we dally with the bare possibility that there may be a thing-in-itself behind or underlying the known world to account for its orderliness, we

A PHILOSOPHY IN OUTLINE

have some logical justification for expecting that the orderliness that has characterised the past will be continued in the future, since the probability that the orderliness is fortuitous, is infinitesimal, and hence the cause of the orderliness, whatever it be, is most unlikely to cease operating at any given moment. But a mere mechanism will not do ; it is not enough to postulate the existence of something beneath the surface of things because if this something differentiated into parts we have merely shifted the problem into another field, and shall still have to account for the orderliness of the arrangement of the non-phenomenal counterparts of phenomenal entities. The desideratum is a thing-in-itself which while not having distinguishable parts should yet determine the natures of a plurality of entities in the knowable world. Such a combination sounds almost like a contradiction in terms, yet it deserves careful consideration, first because of the vital importance for thought of the point involved, and secondly, because of a certain fallacy that has vitiated a great

PROBLEM OF REALITY

deal of human speculation.

This fallacy is that of failure to recognise the separateness of the domains of the abstract and the concrete, and the differences between the characteristics of the two sorts of entity. An expression as simple as $\sqrt{2}$ may be expanded into a series of digits of which the number is infinite and the variety of arrangement unending, and such as might easily appear on casual inspection to be fortuitous. Again a simple name may bring before the mind train of thought unlimited in its complexity. Superficially, therefore, it may not seem unnatural to suppose that in some way of a similar sort the world itself and human history may likewise be merely the expansion of a comparatively simple germ or basis. Hence the acceptance gained by the notion that philosophical satisfaction lay in the direction of interpreting the world as "thought" the assumption being that in "thought" we had something as it were real and yet not real, simple in one aspect and manifold in another, in fact a convenient amphibian.

Unfortunately, this *multum-in-parvo*

A PHILOSOPHY IN OUTLINE

character of symbols and names, which has puzzled men in all ages, leading on the one hand to superstitious practices and on the other to wonder, admiration and mysticism, is at the expense of concrete reality. True the idea of a thing as expressed by a symbol often surpasses, not in convenience for thought alone, but also in completeness and wealth of detail the concrete reality of any particular sense presentation, or group of sense presentations, which constitute the experience of the thing itself, but the detail added is in the case of abstract things abstract, and in that of concrete things fictitious or hypothetical. In other words, the symbol is only the key which unlocks the treasure-house door, but the common fallacy is to regard it as in some way containing within itself all the treasures.

Thus if we ask whether positive concrete reality of any sort actually exists, the answer is as follows. (a) The word "exists" as ordinary understood contains as part of its meaning "in relation to such and such a (specified) self" and in this sense "absolute existence" would be a

PROBLEM OF REALITY

contradiction in terms. If we still insist on using the term, therefore, we shall have to give it some meaning which will not make the existence of a thing depend on the possibility of its being experienced by a self, and hence rule out the possibility of the affirmative to the question ever being proved. For it could not then be proved by experience and is a matter by which its very nature incapable of being proved by abstract, i.e. mathematical, reasoning.

(b) Unless we are prepared to believe in a kind of thing-in-itself transcending the categories of human scientific thought, the probability against the positive concrete existence even in the relative sense, of anything even distantly resembling what is popularly supposed to be the actual world is overwhelmingly great.

III

THE PROBLEM OF EXPERIENCE

Even what the unreflecting mind generally thinks of as immediate experience is at best only that of a single cross-section of the space-time continuum. It may, it is true, contain memories of the past, but only *as past*, i.e. as parts of present experience bearing a past date, so that there remains always the at least conceivable possibility that they are illusory and that we are mistaken in supposing them to represent experiences which we have actually had at the time they purport to have been had by us. We certainly do not *know* anything about the past or the future in the same positive sense as that in which we think of ourselves as knowing the immediate present. The whole of the external world, except, let us say at present for the sake of argument, the immediate environment at the moment, is an abstract structure derived by the application to the experience of

PROBLEM OF EXPERIENCE

the moment; plus what is, on the strength of certain fixed rules or postulates, believed to have been the total experience since the beginning of the individual's history, of these same rules or postulates or of others which they may yield by deduction. Again, the simplest act of judgment, such as the affirmation or recognition that such and such a presentation exists, is essentially a process extending over time and so cannot be supposed to form part of any instantaneous cross-section of experience ; it, therefore, with the question of its validity or otherwise, quite transcends the category of things of which we can claim to have immediate and positive knowledge.

But have we definite knowledge even of our sense presentation at any given moment ? A little reflection will show how closely the meaning of " knowledge " in ordinary usage is connected with the power to describe, or to compare with something else, both of which may involve memory, so that they are not applicable to immediate experience. On the one hand there are subconscious experiences,

A PHILOSOPHY IN ~~OUTLINE~~

sensations, etc., which are unnoticed at the time, but which are proved by subsequent events to have been experienced ; on the other we have such phenomena as those of the Müller-Lyer illusion and of the Blind Spot, which facts show that our knowledge of the exact content of the presentation at any moment is at best very imperfect. I do not propose at present to essay the difficult task of defining knowledge in the metaphysical sense, the definition of which must exclude all reference to discursive processes, or to comparison, but use the word here as I have elsewhere defined it in terms of experience.

Whence, it will be asked, does the law of the Uniformity of Nature come, on which our deduction of the universe is based, or what is its status for philosophical theory? We may, it is true, think of instantaneous experience as consisting of (a) memory images of certain past experiences ; (a¹) memory images of thoughts that certain experiences should be possible owing to (a) having been experienced ; (a²) memory images of actual

PROBLEM OF EXPERIENCE

experiences in verification of the prediction of (a^1); (a^3) memory images of further possible experience imagined as deducible from (a^2) on verified analogy of (a^1) from (a); actual sensations in verification of (a^3), or in some way that would for present purposes be tantamount to such a constitution. Even with this complicated mass of material at various levels of consciousness-subconsciousness, however, it is highly doubtful whether something would not still be lacking before there can be so much as the beginning of a deductive process. But, granting for the sake of argument that the transcendental ego of metaphysics may indeed be said in some sense to be aware of the set of experience-elements (a), (a^1), (a^2), etc., and of the logical implications of their relationship, it nevertheless remains to be said that for all we know reality may consist of either the one such instantaneous cross-section only, or of an unlimited plurality of similar world-bases, nor is there any reason to suppose that in the latter case the world bases would necessarily tend at all to present the form

A PHILOSOPHY IN OUTLINE

corresponding to a continuous series of cross-sections of any one of the worlds which might, by using the principle of uniformity, be constructed on any one of them as a base. In other words, all we can say is that our experience at any given moment is not incompatible with the hypothesis that that experience is one member of a continuous series of experiences, progressively defining a world with extension in three dimensions besides time and exhibiting a certain orderliness which may be designated by the term Uniformity. The corresponding scheme of things in one dimension fewer may be thought of as a world divided by thin, opaque, parallel walls into an infinite number of sections each containing the same amount of matter and of energy, and so arranged that the distribution of matter in each section differs in no case from either of those in the contiguous sections by more than infinitesimal amounts. If in such a world we define (for the purpose of this argument only) awareness of a thing by a self as denoting the fact that the behaviour of that self varies according to the presence

PROBLEM OF EXPERIENCE

or absence of the thing in question, and assume that the arrangement of matter, etc., in the sections follows a law corresponding to the principle of Uniformity (the sectional configurations taking the place of instantaneous world configurations, and the intervals between them that of the time intervals), such law could in itself take the place of the opaque walls between the sections. Thus the assumption that there is an intimate connection between awareness in its full meaning and action is an extremely fruitful one, and, were we able to define the one in terms of the other, we might expect to solve with ease most of the problems now engaging us.

It is only when we abandon direct introspection and adopt the standpoint of the external observer that philosophising becomes easy. For the "ego" we have an empirical entity lasting through time instead of having only a momentary certainty, a nervous system the condition of which at any given moment, though but very imperfectly known to itself, can yet be conceived of as being in its entirety open to study by an outside observer, who

A PHILOSOPHY IN OUTLINE

would find there a most exact and adequate apparatus for the application of past experience to the ordering of future behaviour. This empirical self, which I should define as the nervous system in its capacity as an organ of the function compounded of perception and action, is a pure abstraction, but nevertheless it is the only "I" that in practical life there is any occasion to concern oneself about. It is the empirical self that loves and hates, that shows constancy or fickleness, that *knows* facts and distinguishes things from one another.

Thus in answer to the question of my position regarding the existence of the universe, it will not do merely to say that I affirm it on the strength of my introspective experience, because the "I" referred to is still a hollow mathematical figment, namely the empirical self. To say a thing looks green may mean merely that my reaction to it has a certain characteristic in common with my reaction to grass, carbonate of copper, the emerald, etc. It *may* mean something more than this, namely that the ultimate concrete

PROBLEM OF EXPERIENCE

quality of the sensation I got from it of which the characteristic feature of my reaction is presumed to be the result also resembles that from the other things classed as green. There is, however, no practical test or criterion for distinguishing the two meanings. In the same way, when I assert that the universe exists there is no criterion for testing whether I refer to the abstract form of the universe or to the concrete substance of which that form is a characteristic. In the former meaning there is no doubt that my assertion in question would be true. In the latter it is incapable of being tested and the argument *cogito ergo sum* begs the question.

It will be remembered that a point remaining unelucidated is the nature of the "knowledge" we have of immediate experience, and just how what we conceive as the universe comes to be attached to this immediate experience. To arrive at a clear understanding of the situation as regards the possibility of a definite answer to this question, we shall have to consider the problem of psychology.

IV

THE PROBLEM OF PSYCHOLOGY

“ But ”, the reader exclaims, “ I know positively, though I cannot account for it, that to me at least the world *is* real, so there must be some fallacy in your argument ”.

The mistake arises through the ambiguity of the word “ I ”. Who or what is it that “ knows ”? Clearly it is the empirical *ego*, the mathematical figure which is that of the nervous system contained in the animal possessing the characteristics that cause it to be called an Edward Stanley Bennett. Its definition consists of the sum total of all that an E.S.B. knows about itself, which in turn depends on the total of all that has occurred in the mental experience of the E.S.B., up to the time called 11.30 p.m. February 12th, 1925, in a world of which the definition is : all that an E.S.B. knows about its world. (“ Knows ” may be defined by saying that that is known

PROBLEM OF PSYCHOLOGY

which can be inferred from (i.e. is determined by) the behaviour of a self to have constituted a sense experience of the same self in the physiological meaning of an experience affecting the sense organs. "Mental", involving functional behaviour of the nervous system as contrasted with physiological behaviour, the relation of the former to the latter of these being analogous to that of the work of the "Traffic" and "Technical" departments of a railway respectively.) All words which I utter, or other signs I make to indicate what is in my mind are, whatever non-physical reference or significance they may be supposed to possess, nevertheless physical events and as such are necessarily determined by antecedent physical events. Throughout the entire range of established human experience—omitting as debatable the phenomena of occultism—Nature appears to proceed according to the law of the determination of events by their immediately preceding antecedent events, but let us assume the possibility that in the working of the animal brain this rule may be departed from. Animal behaviour

A PHILOSOPHY IN OUTLINE

will therefore be determined by a combination of the immediately antecedent events and some other factor or factors, which will naturally be sought in the past experience of the animal (unless indeed we suppose—a view not pointed to by any known facts—that factors altogether external or transcendant may operate, which, although finding favour in certain quarters where it is deemed essential to “freewill”, would appear hardly distinguishable from the introduction of a factor of pure chance, a distinctly disquieting notion). That is to say, the whole of my behaviour is a function (in the mathematical sense), if not of my immediately preceding experience only, at all events of my experience at some time or times, and that in accordance with some law at present unknown but nevertheless quite definite. Without stopping to enquire further as to the distinction between the mental and the physical, we may lay it down that behaviour is determined by mental conditions which are in their turn determined partly by the physical environment and partly by preceding mental

PROBLEM OF PSYCHOLOGY

happenings ; the factors in the determination of these preceding mental happenings in their turn are similarly partly physical and partly mental and so on. Carrying the process far enough back, we arrive at a point where behaviour is nearly pure reflex and the effect of previous mental experience in modifying the response to sense stimuli practically vanishes. Thus a person's behaviour as a whole may be said to be completely determined by his or her physical experience as a whole.

As is pointed out elsewhere, Nature is averse to assisting the psychologist in his work of introspection. Sensations proper are no doubt determined absolutely by external stimuli producing energy currents in the afferent nerves ; these currents find their way eventually to the efferent, or motor, nerves. •What happens in the interval is only very indistinctly understood, but may conveniently be pictured in the mind on something like the following lines.

Think of the nervous system as composed of three parts : 1. A system of afferent nerves the stimulation of each of

A PHILOSOPHY IN OUTLINE

which corresponds to a unit in the mosaic which makes up the sense presentation ; 2, a system of efferent nerves, each of which on stimulation arouses some specific action of the body ; 3, a network of nerve connections uniting the brain ends of the first with those of the second, and containing gaps, or synapses, through which nerve energy can pass in one direction only, a certain minimum of energy being necessary for a synapse to be passed at all, and this minimum for any given synapse being variable and suffering reduction each time energy passes through. From such an arrangement the following laws can be deduced. (a) Streams of energy passing through the network coalesce when they meet, like streams of water passing over a plain on their way from the mountains to the seas and cutting their beds continually deeper. (b) As in the physiographical analogy, a body of energy may be pent up by synapses of high resistance and then released by the course of another stream undergoing a change so as to drain it off. (c) A stream may change its course owing to some

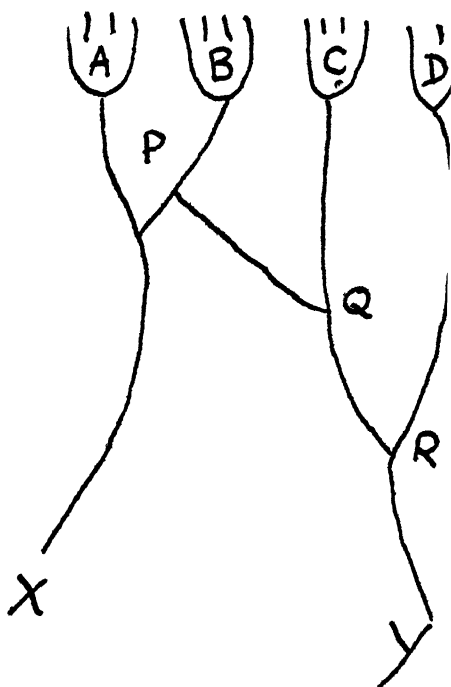
PROBLEM OF PSYCHOLOGY

members of the group of tributaries that supply it ceasing to yield energy and others taking their place. (d) Like the case of rivers overflowing, the energy tends to spread when obstructed, and goes on ramifying until an outlet is hit upon.

In this way a stream normally receiving energy from a particular set of afferent nerves, C, may receive it at a "lower level", Q, owing to A ceasing to yield energy and the energy from B overflowing into PQ instead of being drained by the system AX. The system C may not yet be able to discharge till it is drained through R in consequence of energy beginning to come from D and passing down DY, R being at a lower level than Q, that is, further downstream in the direction Y.

This discharge of QR by the help of D is the physical counterpart of an *image*, and it is clear that its effects will resemble the more closely those of the physical counterpart of actual sensation in proportion as Q is near to C.

A PHILOSOPHY IN OUTLINE



PROBLEM OF PSYCHOLOGY

Of the group CD of sensation-elements, either C or D may be put out of action, but the remaining part will still drain along RY. On the other hand, of the group ABC the cessation of energy from A or C may determine whether the remainder discharges through X or Y. Relations of this sort bind together the stream of energy into a unity, which is correlated in such a way with the motor activity of the organism at any moment that the latter is not merely the resultant of the former, but has its details determined to a greater or less extent by the individual elements therein. The further downstream the point at which it ceases to be possible for the course of the stream by which the energy from a given afferent nerve discharges to be modified by the cessation of energy from that nerve, the greater is the degree of *attention* which may be said to be bestowed on the corresponding sensation, that is, the greater the part played by that particular unit of sensation in the determination of behaviour as a whole.

Now let us return to the conception of

A PHILOSOPHY IN OUTLINE

mental space as a net, the meshes of which represent functions of the families of motor activity corresponding respectively to various systems of efferent nerve-paths, this net being crumpled or distorted to any extent in relation to physical space. One way of studying the presentation, which may be called the psychological, is to consider each sense unit in respect of the place it occupies in mental space, meaning by mental space that space world which can be disturbed by pressure of the finger on the eyeball. This psychological standpoint is the one approved by nature who is clearly out, for benevolent ends, to deceive us into the belief that the reddish-yellow colour in the sensation we get from looking at an orange is a sort of skin which clothes the fruit itself and, although we can at any moment detect the imposition by merely pressing with the finger on the corner of the eye and thus making the image betray its insubstantiality by dancing about with every variation of pressure, she will not pander to any mere idle curiosity concerning the true constitution of the image, which the

PROBLEM OF PSYCHOLOGY

blundering psychologist having detached it from the actual orange, will naturally seek to locate in the brain itself; introspection will tell us nothing we have not a biologically legitimate reason for wanting to know. Another way of approach to the presentation, which we may call the physiological, is to pursue the sense unit, as it were, into the brain and study what its intimate nature is and how it comes to occupy just that particular place in mental space.

Selecting the physiological line of study, let us suppose by a suitable combination of mirrors, microscopes, x-rays, etc., a man is watching his own brain at work and in particular is looking at the very structural elements which correspond to the place in his mental space towards which his attention is directed. At this particular place we might expect to be able to superpose and compare an element of the psychical world with the corresponding element of the physical and thus determine what the former consisted of in terms of the latter.

(First of all we must suppose that by

A PHILOSOPHY IN OUTLINE

some device analogous to the staining and other methods by which minute histological structures are rendered visible, it is possible to isolate for observation the part of the cerebral structure which is *par excellence* the seat of sensation. We might even have to suppose the object as studied with the help of some radiation of infinitesimal wavelength and the resulting data transformed, as alternating electric currents are transformed, into ordinary light equivalents. Again, we cannot necessarily assume that the colour presented to the eye by this structural unit of the brain, whatever it be, will be identical with that representing the particular part of the mental world it corresponds to, as the light employed would presumably be that of some external source. However, the doubtless insuperable practical difficulties in the way of carrying out such an experiment need not detain us, for, so long as we believe there is a physical happening corresponding to the perception of a point, there must be some way by which it could be observed, whether more indirectly or less so. It is

PROBLEM OF PSYCHOLOGY

merely for the sake of clearness that I have supposed the above relatively direct observation to be feasible.)

Leaving aside the question of the time taken by the light to reach the retina through the apparatus, which may be taken as negligible in comparison with that necessary for any appreciable change in the nervous mechanism, we are confronted with the following difficulties.

(a) The problem of defining in terms of molecules, atoms, electrons, ether, or what not, the sensation-stuff which we have had to assume was in "some" way isolated and made amenable to scrutiny ; (b) that of locating in the physical structure of the nervous system the cells or other units peculiarly connected with this sensation-stuff. For, while it might appear natural to locate these in the organs of sense on account of the characteristic structural differences between the terminal cells in these organs, all experiment seems to show that stimulation of the afferent nerve at any point yields a sensation identical in quality with that normally received through it. On the other hand,

A PHILOSOPHY IN OUTLINE

the structure of nerve fibre throughout the brain seems so uniform that it is hard to believe that differences such as those between the various colour sensations can be correlated with any peculiarities of nerve structure in the brain itself, which has all the marks of functioning merely as a very complicated telephone exchange, providing connections for impulses to pass through, rather than being a starting-place for impressions of any sort. (c) The circumstance that what appears under the psychological or "inside" aspect as static and extended continuously in time, has another "outside" aspect under which it figures as a dynamic process involving for each psychical instant (= the time interval which can not be distinguished by introspection from simultaneity) a finite quantity of energy not less than the minimum necessary to modify the nervous mechanism to the extent of leaving a trace for an appreciable time. Moreover, a process involving the conversion of a finite amount of energy cannot be instantaneous. There is nothing in the psychical experience of sensation

PROBLEM OF PSYCHOLOGY

itself that can possibly constitute this performance of work (though of course certain things in the functioning of the mind as a whole might in a sense be adduced as parallels to the consumption of energy).⁶ It may be objected :—Is not the experience of pleasure-pain to be regarded as a psychic force? But the analogy fails because, while physical forces act upon individual particles, pleasure-pain has for its objects, not elements of sensation as such but cases of experience masses taken as wholes.

Again, what is it in the physical world that corresponds to a point in mental space? It is a certain system of nerve-centres or units of nerve organisation and by no means a simple system. Thus, for any position of the eye in the head, it may consist of at least as many nerve-centres as there are possible starting positions from which, say, the hand may be moved towards a certain point, and this number will have to be multiplied by the number of possible positions of the eyeball in its socket, since the kinaesthetic sense data connected with the rotation of the eyeball

A PHILOSOPHY IN OUTLINE

are necessarily a determining factor in a judgment as to the position of an external object.

Now, were the cerebral counterpart of a sensation-element at a point in mental space a minute speck of consciousness-of-colour at some point in the course of a nerve-fibre through the brain, one might possibly be tempted to regard an experiment of this nature as solving the problem of mind-matter by showing the ultimate identity of appearance with reality: at one time one, and at another time another, part of a real world would be mirrored in the brain by a mosaic the elements of which would correspond in one-one fashion to the elements of the bit of reality concerned, and the place in mental space to which the sensation-elements are "referred" being assumed to depend, not on the actual space-relations of their external counterparts, but on their place in a "crumpled-net" space formed by nerve-elements. When, however, we press the inquiry concerning the meaning of the "referred", we find that the counterpart in the brain of a point in mental

PROBLEM OF PSYCHOLOGY

space far from being a mere point in a network of nerve-fibres, is at least a two-dimensional manifold of nerve-elements, to each point in the visual image of which there must correspond a similar but not identical manifold of nerve-elements, and so on indefinitely. Thus, instead of a complete circle of sensation, from brain "something" through ether waves and retinal stimulation back to the same brain "something" again, the "something" being in respect of its extension in space of the nature of a particle, that which alone I am compelled to believe ultimately concrete and to form the actual stuff of experience, must be a thing of which presentation-element and nerve-cell or what not are alike but functions, but of which a certain complicated function is identical with the thing itself, or, symbolically, $f(x) = x$, where x is not an imaginary number, but a concrete thing or system.*

In the light of other achievements of

*E.g. if $x = \frac{-1 + \sqrt{-3}}{2}$, then one value of $f(x)$ is x^4 .

A PHILOSOPHY IN OUTLINE

modern mathematics the writer is disposed to regard this problem as not insoluble. Were a solution found, and also the difficulties (a), (b) and (c) connected with sensation surmounted, the last it might be by some sort of quantum theory applied to sensation, the baffling impasse of metaphysics would stand out clearly in all its nakedness. For the intimate and mysterious marriage in perception of sensation and action, which really belong to opposite ends of the nervous system, cannot be effectively studied except by some method which would deal with the living protoplasm of the nervous system, or some essential part of it as indivisible whole instead of merely as an assemblage of parts, the only way it is known to ordinary science.

V

THE PROBLEM OF LIFE

Ordinary science teaches that the simple dynamic processes out of which at least the inorganic universe seems to have its history built up are strictly reversible ones wherever molar magnitudes are concerned. So far as we knew until quite recently, if, in an inorganic world every ultimate particle, electron, ether wave, etc., could at a given moment have its motion reversed, history would proceed from that moment to enact itself backward, and the modification of that view required by the quantum theory does not invalidate it for the purposes of the present argument. A little reflection, however, will convince us that reversal is not to be expected in ordinary experience where appreciable quantities of matter are concerned. For example, if a stone drop on the ground, its energy is dissipated and converted into motions among the molecules, etc., composing the earth around it, which

A PHILOSOPHY IN OUTLINE

risers very slightly in temperature. Now there is nothing to prevent these molecules, etc., by a sacrifice of their spare energy at any moment giving to the stone an impulse which would send it leaping up to the place it dropped from—nothing except the improbability that the necessary co-ordination of motions should occur by mere chance. In the very fact therefore of the non-reversibility of phenomena to be observed in everyday life we have thrust before us that aspect of the inorganic universe in which it resembles a clock that has been wound up and is running down. The distribution of matter is to some extent orderly, vast numbers of molecules in the same kind being usually found together, instead of their being distributed in a totally haphazard way, while energy also is particularly concentrated in certain places.

The orderliness of the circular waves that form when a pebble falls into a pond results from orderliness pre-existing in the form of the uniformity of density and consistency of the water and of the evenness of its surface. On the other hand, in

PROBLEM OF LIFE

the phenomena of life we are presented with a set of clocks, as it were, running up. There would be nothing surprising if animals or plants brought into being in the laboratory after the manner of Frankenstein's monster proceeded to disgorge material continuously and be gradually absorbed into their environment so as to dwindle eventually to unicellular dimensions. It is a commonplace of science that the laws of thermodynamics could be upset without any expenditure of energy by placing beside a minute trap-door in a partition between two gas-filled enclosures a little demon who would open it when he saw a molecule approach from a particular side with a velocity greater than the average, and close it in the face of a slow-moving molecule. Wherever living protoplasm is, a demon of this sort seems to be at work regulating the process of metabolism so as to secure a reproduction of the parent organism. The embryos of a man and of a dog are up to a certain stage of development indistinguishable to human scrutiny, and the inference is hard to avoid that the structure of the fertilised

A PHILOSOPHY IN OUTLINE

ova in the two cases would present no difference even though magnified until the individual electrons could be separately observed. It would appear (see Osborn, *Origin and Evolution of Life*) probable that Science may transfer the biological problem from the field of physiology to that of chemistry. That, however, does not bring a solution into sight, because it is just as hard to understand why one very highly complicated molecule should multiply and yield other molecules exactly similar to itself as it was to Paley to imagine a watch giving birth to little watches. Nevertheless, it is the fact of experience that never, never, does the course of development depart from the hereditary principle. The human embryo may turn out a monster and altogether unlike his father, but will never grow into a dog. The mere improbability of the alternative drives one to suppose some such explanation as that under certain conditions the arrangement of atoms in certain very complex molecules throws the ether into a condition such that the aggregate effect of the molecules of the

PROBLEM OF LIFE

kind in question composing a living cell constitutes a sort of channel in the fourth dimension (time) and in some way the behaviour of the cell is regulated or directed by events, not in its immediately past history only, but also by events in its history at a finite interval back.

Now the quantum theory in its latest development asserts that in certain respects the behaviour of the individual atom as contrasted with the average behaviour of a large aggregation of atoms—is indeterminate, that is, in so far as observable conditions are concerned, its behaviour has at least one factor which is left to chance. This opens the door for the operation of some other agency, such as that whatever it is that forms the basis of life, to determine the behaviour of the atom in those respects which are otherwise undetermined.

Once it could be definitely asserted that this is what happens, it may be that, not only should we have taken the first step on the road to understanding the mechanism of ontogeny, but some such principle, peculiar to the living organism might be

A PHILOSOPHY IN OUTLINE

found to yield a comparatively simple explanation of memory, of which at present Occam's razor compels us to invent theories vague and far-fetched at the best.

Again, the fact of anabousm in vital phenomena relieves us of the difficulty with the Creation ; that is to say, there is no more reason to look upon the history of the physical universe as that of the unravelling of events for some starting point in the distant past, instead of simply as that of a world happening for some inscrutable reason to show at all times in a certain direction in time a persistent tendency to changes from more orderly to less orderly forms, than there would be to seek in the form of an animal's body at the time of its death, more than at any other moment of its existence, the true cause of the development of the animal from a germ. Both alike are mysterious and inexplicable facts of experience, the only differences being that in the case of the inorganic universe the orderliness increases in one direction, only a small fraction of a " life " (a running-down

PROBLEM OF LIFE

process) is available for our study, and the detailed nature of the process is known fairly intimately, while in that of the living organism the increase is in the other direction, an ample plurality of lives ("running up" processes) come under our observation, and our present knowledge of the mechanism can hardly be said to extend beyond speculative guesses.

.VI

THE PROBLEM OF GOD

In the course of our consideration of the foregoing problems we have found that :

(a) The problem of consciousness lies in the fact that the objects of all scientific thought are essentially abstract, yet to assert the "fact of consciousness" is to assert the existence of something concrete.

(b) Taking existence in the strictly relative sense in which *cogito* proves that *sum*, the *a priori* improbability of the world of experience points to the existence of another world altogether transcending scientific thought.

(c) "I" has two meanings : (1) a passive, inert *fundamentum relationis*, the existence of which is incapable of being proved to the satisfaction of (2) a mechanism forming part of the abstract structure which the physical universe is, and knowing that universe through a process, experience, at present unelucidated and, owing to a

PROBLEM OF GOD

peculiar, unexplained, and perhaps not completely explicable, psychological illusion (arising from the unanalysability of sensation and the fusion, as it were, of the discrete elements on which is based the determination of the relational features of the presentation) appearing to endue the universe with some of the characteristics of concrete reality, in particular the differences in ultimate quality of the parts composing it and the mutual interaction as it were of these parts involved in the idea of their co-cognition. (The fact of particular appearances being illusory does not in any way prejudice the question of the possibility of concrete reality in the strict sense.)

(d) The universe exhibits the following kinds of orderliness :—(i) the sequence of physical events in time, (ii) the partial segregation of masses of matter and quantities of energy in space, (iii) the law of ontogeny.

The orderliness of coherencies comprised under these three headings constitute a trinity of interrogations to which no significant answers are possible. It may

A PHILOSOPHY IN OUTLINE

sometimes be desirable, for grammatical convenience, to hypostatise as it were, these interrogations by the use of substantives with the meaning simply of "that which is known would explain away the *a priori* improbability of the world." For such a substantive the writer would suggest "physical otherworld" as relatively free from objection. The term "God" has of course been used, but in so far as the orderlinesses under consideration are of the nature of conformities with fixed laws any term suggesting personality would appear inappropriate.

(i) and (iii) consist in conformity with fixed and constant rules; (ii) however, represents merely the fact that a certain amount of orderliness exists, without specifying the extent, or the particular scheme of coherence. There is, indeed, a definite coherency observable in what we know as organic structures, but these form only a small part of the universe. As to the remainder, no one definite plan can be discerned, possibly because human observation does not extend back to the actual time when the great clock of Nature

PROBLEM OF GOD

began to run down. For, if the simplest set of points coherently arranged (that is conforming exactly to some definite plan, as, e.g., an equilateral triangle or an octagon) be disturbed by even the simplest coherent transformation, it almost immediately becomes impossible by inspection to distinguish the superposition of the one coherency upon another from a perfectly haphazard arrangement, and, conversely, a configuration perfectly haphazard in appearance may *if we have the key* prove actually to be only a few steps, or perhaps a finite though large, number of steps, removed from manifest coherence, or, on the other hand, it may be indeed totally incoherent.

Now any marked coherency which may be observable between events affecting different animals as functioning organisms or in the relation between animals and their physical environment, such coherence being of an order not possible to infer by mere scrutiny of the pre-existing conditions, can only be ascribed, together with the coherencies (i) and (iii) to the transcendent otherworld, and if so be

A PHILOSOPHY IN OUTLINE

that the coherence is of such a kind as can be most conveniently represented discursively by the language appropriate to human volitional relations, this particular coherency can nevertheless not be ascribed to any agency distinct from the physical otherworld (because we cannot distinguish parts or division of functions in the otherworld) which accordingly takes on personal attributes and becomes God.

It must be remembered, however, that the question of whether there is a God, or, as some would have it, whether God is personal, is strictly a question rather of whether the observed coherence of human experience is or is not to some extent or in some respects such as is most conveniently represented in the language of human volition, that is, if it is or is not true that the universe behaves *as if* a human will (amplified and extended in powers and range, but still a *human* will) was directing it. For of course "person" can only mean "that which has certain specific attributes characteristic of human beings."

PROBLEM OF GOD

For an answer to the question of Theism *v.* Atheism I must refer the reader to history and experience, it being for philosophy only to point out the logical and scientific status of the concept involved.

VII

THE PROBLEM OF AESTHETICS

Psychology may be described as the study, in its functional aspects, of the mechanism by which the discrete stimuli reaching the nervous system through the organs of sense are gathered up and co-ordinated to form organic systems of the function called action, that term including in its denotation all the functions of efferent nerve systems, motor, chemical, etc. It may therefore be called the analysis of the *behaviour*, in the most general sense, of animate organisms as such.

Aesthetics is the special department of psychology which considers the characteristic responses of the organism to *things*, a thing being that in the physical world which is represented in the mind by a percept. That is to say, it inquires just what it is in the organism's response to a given mass of experience which causes us to identify that mass of experience with

PROBLEM OF ÆSTHETICS

the presence of a thing, as distinguished from a mere incoherent mass of experience in general ; and, having done so, proceeds then to investigate the conditions that determine degrees and varieties of "thinghood". There is no term in common use which can be applied comprehensively to the responses—recognition of the beautiful, the ugly, the comic, the artistic, the pretty, etc., with which aesthetics concerns itself, and therefore some technical term such as *emotional reaction* has to be used to denote them.

Behaviour among the higher animals consists in the continuous reception by the self of energy in the form of perception and its emission in that of co-ordinated activity. In a beast of prey, for example, the visceral stimulation of hunger causes the animal to rove about, sweeping the surrounding scene with its eyes and sniffing the air with its olfactory sense on the alert. Presently the situation is changed and the animal dashes off in pursuit of its quarry guided by the visual sense which remains persistently focussed on a small rapidly-moving speck. Next,

A PHILOSOPHY IN OUTLINE

an entirely different series of sensations is determining the movements of paws and jaws in tearing the victim, and of the throat in swallowing its flesh. When the process is completed the animal will sleep. During the pursuit the animal's imagination *may* be anticipating the taste of the blood and the sensations of crunching through a warm, soft, quivering mass, but more probably it will not. The moving object may indeed be an electric hare which will never be caught, and the dog may have abundant experience which must uniformly have gone to teach him that fact. Moreover, a dog can be taught to deposit its catch instead of devouring it. Human behaviour in general, though much more complicated, is fundamentally of the same nature as that of the dog retrieving a bird which it is not going to eat. It consists of a tissue of fragments of primary, or instinctive, conative processes, all incomplete though frequently more or less co-ordinated so as to lead up towards some remote purpose or object, thus constituting what may be called a secondary conative process.

PROBLEM OF ÆSTHETICS

There is this difference between primary and secondary conative processes, that in the former, inasmuch as it depends upon a congenital arrangement of nerve paths of which the purpose and *raison d'être* is a demonstrable fact of biological science, there is an obvious and palpable organic connection between the object, or goal, of the process and the process itself in its various stages, while for the latter to have an object at all is not necessary, but is merely a frequently occurring circumstance. That such should actually be the case as often as it is, arises of course from the way in which substitution among conative processes are brought about. An obstacle is met with which interrupts a conative process ; the inhibition of one sort of action, involving accumulation of neurokyme, immediately sets up images corresponding to the various associated courses of behaviour. Each of these courses in turn is pursued in the imagination, conscious or unconscious, until either an inhibition is met with, when another is called up for exploration or a state of unimpeded activity

A PHILOSOPHY IN OUTLINE

is imaged, when, the neurokyme being absorbed into the efferent tracts, further imaging does not take place, and the initial steps in the course of behaviour that has prevailed are automatically entered upon. Now, in the case of normal persons, all major acts are in general so thoroughly organised to contribute directly or indirectly to the maintenance of the person's social and economic status that any ideas or behaviour that flagrantly violated this principle would usually (as they would tend to lead to unpleasant situations) sooner or later be inhibited, and thus eliminated from the running. Hence it is more frequent to find that the major acts of human conduct have a more or less clearly assignable object or purpose. Thus, while the "object" of a primary conative process is determined by the congenital constitution of the animal, that of a secondary one is determined by the individual's knowledge of his or her circumstances together with the character of the same individual as modified up to the time in question by environment, and is thus a thing in an entirely different

PROBLEM OF ÆSTHETICS

category. Modern psychology is continually stressing the smallness of the extent to which human actions are rationally directed to any assignable ends.

With these conceptions clearly before us, we can proceed to distinguish acts of behaviour as transitive or intransitive in character.

The former class includes all acts that are carried out to effect some known ulterior purpose. The latter comprises the behaviour-classes play, sport, and art.

Pure play consists of acts that are either imitative or spontaneous, such as a girl's fondling of a doll, or a boy's brushing of a stick along a fence. These are acts performed "for" the mere pleasure of doing them, but not as a means to any end conceived in the child's mind. Sport and art are special varieties of play, having added, probably as the result of a subconscious urge to "justify" the play, in the first case an interest in the act as a display of personal prowess, and in the latter as a doing or making of something where a deliberate effort is shown to do it, or make it *well*, the "well" of course

A PHILOSOPHY IN OUTLINE

meaning, not "commendably" in the ethical sense, but "succéssfully", i.e., that the product has its thing-hood distinctly emphasised, as by showing coherence, uniformity, mellowness, unexpectedness, symbolism, etc. Again the term "act" as used in this connection, means simply "that in behaviour which is considered to constitute a *thing* and hence, for example, the production of a material object, say a picture, can be considered as having an unlimited number of sorts of acthood, such as making-a-harmonious-object-with-a-maximal-display-of-skillful-workmanship, representing-an-object-of-peculiar-beauty-or-sublimity, making-an-object-productive-of-exhilaration,-surprise-or-other-emotional-reaction, making-an-object-appropriate-to-decorate-conventionally-the-parlour-wall-of-a-bourgeois-residence, etc., etc. The "artistic merit" of a picture may denote the degree of success with which any one of the above specified, and many more, objects has been accomplished, and a similar ambiguity of a similar sort affects an appraisalment of its antiquarian or collector's value.

PROBLEM OF ÆSTHETICS

Hence the confusion which has so often characterised attempts to formulate fixed standards of "beauty", etc.

VIII

THE PROBLEM OF CONDUCT

Ethics deals with the responses peculiar to a particular class of thing, namely the *person* or a group of persons, and deals with them in respect of those of their characteristics which arise from the fact that the things to the perception of which they are responses belong to that particular class. The subject-matter of ethics is therefore that part, or those aspects of behaviour which are known as conduct.

The most primitive behaviour follows instinct alone; next comes habit, an alternative to instinctive behaviour which is followed or not according to the conditions under which the stimulus is received; by the multiplication and superposition of habits, a stage can be reached when almost *any* stimulus may, according to the individual's state of mental preparation, determine almost *any* behaviour of which the organism is physically capable.

The phenomena of conduct are no

PROBLEM OF CONDUCT

exception to this rule. Many people will always obey the commands of a parent, not from clear foresight, or even reasonable presumption, of any particular painful or otherwise undesirable consequence likely to result from disobedience, but simply from habit which is difficult to resist. The custom of training up children to abstain in a general way from such sorts of conduct as may be labelled "wrong" has unquestionably played an important part in the evolution of civilization, inasmuch as it has placed in the hands of parents and teachers a lever with which to control, from the inside as it were, the conduct of the child during the period between that when physical constraint is easy, necessary, and alone effective, and that when education is complete and a definite system of socially useful habits has been more or less permanently established. For the conditions of modern civilized life are so far removed from those of the forest, and tradition has so far usurped the function of heredity in the evolution of the human race, that without such a lever the mental equipment

A PHILOSOPHY IN OUTLINE

necessary to fit man for the struggle of life could scarcely be acquired.

Throughout the history of human society the tendency has been from a rigid set of mystical taboos, accepted without knowledge of origin or purpose, to logically consistent and less drastically enforced codes of conduct of which the social utility is more or less clearly evident. With increasing complexity and vagueness in the ethical code on the one hand, and on the other the increasing range of human knowledge and curiosity, it is but natural that some expedient should have come into use to supplement the prestige of the code of conduct it was desired to preserve. Such an expedient was readily found in the conception of the Right as resting on some mystical principle in the nature of things which is normally conformed to by the whole human race, the prevalence of obvious exceptions being conveniently balanced by maintaining the fiction or half-truth that at some time in the past duty held over mankind a sway much more paramount than at the time being. In this

PROBLEM OF CONDUCT

way the tremendous force of suggestion was brought into action, for if a man believes that in his particular circumstances all men naturally act in a certain way, that is nine-tenths of the battle towards inducing him to take the same line of action.

When an ordinary parent says to his child "it is wrong to tell lies" his meaning is "I do not wish you to tell lies for a certain peculiar reason which you must not expect to understand fully until you are grown up", though there may be additional considerations—such as that honesty is the best policy—in favour of truth-telling which are more obvious. However, when the same parent says to a grown-up neighbour that it is wrong to sell one's country, he means that, whatever other drawbacks it may have in addition, such conduct would be a violation of a certain code which he finds himself subscribing to and considering important, though he CANNOT GIVE A "REASON" for his attitude. (We speak of a *reason* for abstaining from smoking opium as well as of a *reason* for asserting the Binom-

A PHILOSOPHY IN OUTLINE

ial Theorem. In the second case we are using the term in its true meaning of a logically complete and conclusive argument, while in the first we have merely a sort of metaphor, the thought being that a person can no more indulge in that which is injurious to health, etc., than, say, an equilateral triangle be other than equiangular.)

A considerable amount of ingenuity has been expended in the search for a formula, such as "conformity to *Li*", "self-realization", "the greatest happiness of the greatest number", "good citizenship", etc., which shall express a specific meaning for this idea of *ought* in the fundamental sense, and, although the search is just as certain to fail as is that for an expansion of $\sqrt{-1}$, the causes which have led these endeavours to be made are so important as to merit careful consideration.

The truth is that when we throw the light of sociology on the actual part played in human affairs by the various precepts as to right and wrong which parents impart to their children, we find

PROBLEM OF CONDUCT

their *raison d'être* is not one but many. The claim's of one's own future, of one's family, of one's country, of posterity, and of humanity in general, may all appear in the guise of Conscience as a "better self" which controls the impulse to gratify short-sighted desires. However, the modern citizen, in so far as he is free to order his conduct, finds himself urged simultaneously, and in cross directions, by at least two pairs of opposing forces, self-interest versus altruistic impulses, and ambition and achievement versus the line of least resistance, and experiences, is deciding what his conduct is to be, a difficulty which is serious in proportion as he possesses independence of mind.

What is called idealism—in the common, not in the technical, philosophical, sense of the word—is simply the conviction that there is some sort of abstract "duty" to the bar of which all these various claims may be brought and tested one against another. It is a doctrine of optimism inasmuch as it is almost invariably associated with a vague belief that, however few others he may see following the path

A PHILOSOPHY IN OUTLINE

of their "duty" the day is bound to come when the whole world shall recognize the beauty of righteousness and enjoy its fruits ; and it is one with driving power, since it gives a man the feeling that by keeping alive the humble fire of virtue in his own life he is carrying on the precious tradition and thus contributing towards the eventual glorious consummation. This view is naturally a very powerful one, especially among educationists, although except as I shall presently explain, in spite of the plausible volumes written in its praise, it is one that in the light of scientific psychology must be held altogether erroneous, notwithstanding that the craving after idealism, after a lead, the craving to be "told what to think" in matters of conduct, is a profound and universal fact wherever human intelligence stirs.

The conception of duty, which in the light of modern knowledge might be defined as the code of conduct which the individual adopts in principle on subconscious grounds, and consequently may or may not actually follow in particular

PROBLEM OF CONDUCT

cases, is, however, an old-fashioned one. The conscientious man probably knows at the back of his mind that from a certain point of view he is liable to share the odium that falls to the lot of the prig. I have elsewhere referred to the organic character of the *character* of a human being, how a structure of which the conscious self has only the vaguest inkling is built up by the accretion of behaviour dispositions which, after being dallied with as mere conceivable alternatives, are clinched by successful experience, actual or imaginary, and the elimination of such as are found to lead to unacceptable situations. It is much more easy to move the modern free-thinking mind to agree that an organic group of behaviour dispositions, as exemplified in the personality of such and such a person, is one as a whole desirable or the reverse, than it is to obtain support for this or that particular taboo. But the problem is complicated by the fact that the conduct which is voted undesirable on prudential or social grounds, is frequently the behaviour of a personality

A PHILOSOPHY IN OUTLINE

aesthetically fascinating and hence there is *pro tanto* a strong impulse towards imitation of it. Even where, on the other hand, the conduct of which it is a question is in perfect harmony with what is approved by a consensus of the most enlightened judgment, there is a priggery—an agreeable consciousness of moral distinction, of glorious isolation even—derived from knowing oneself a gentleman, a good sport, a devotee of art or a savant, etc., which is just as real as that derived from unfailing attendance at church, and the fear of displaying such a priggery may prove just the turn of the commutator that will reverse the mechanism of the imitative impulse, and probably the psychology of much recidivist criminality rests on a basis of this sort. Thus the problem of selecting for actual adoption the train of conduct which follows most naturally out of the organic complex of the self's character is not solved, but merely carried into another plane, by the substitution of an ideal character for an ideal code.

Against the destructive proposition

PROBLEM OF CONDUCT

which denies the existence of abstract duty what have we that is constructive? Two things: (a) religion, and (b) enlightened freedom of conduct. (a) Jesus Christ proclaimed the complete subordination of the individual's and, some may contend, of all, claims to those of humanity, as children of one Father. He represented that as God's will for man, that is, as forming part of the purpose of God for man, and therefore as the line of conduct in the following of which Divine co-operation may be relied on and an inner piece of mind attained.

Christianity is nothing if not a revelation. The Gospel is something, not merely about the laws of Nature, but about the facts of Nature. Whether the Christian Gospel is a veridical account of the facts, is a question touching which opinions of experts conflict, but for those who accept it it affords, at least as regards general principles, a genuine solution of the problem of conduct. Other religions may also afford more or less complete solutions if, and in so far as, they can produce a theology that does not conflict

A PHILOSOPHY IN OUTLINE

with the individual's reason, and an unquestioning resolution on the part of the believer, if necessary with the conviction of special support from the forces of the other-world, to maintain the pragmatic attitude enjoined by his religion. (b) (1) The man who knows his own mind is always more at his ease than the man who does not, and therefore the more consistent a system of habits of conduct a man possesses, the better for his general happiness, though the point comes where the individual may not deem the increase in comfort and simplicity to be worth the further expenditure of care and thought necessary to attain it. His own convenience will thus naturally lead the individual—and this may be judiciously pointed out by the educator—to endeavour to build up a consistent system of conduct by applying his judgment, sagacity and experience to the question of which claims should in which circumstances be allowed to prevail over which others, taking into consideration (2) the fact that certain principles of morality have been held as such over a very extensive part

PROBLEM OF CONDUCT

of human history ; these may be bound up with human institutions in ways much more numerous and subtle than can ordinarily or ever be brought before the mind at any one time—a reason for accepting guidance from one's elders—besides that they are probably much more strongly entrenched in the subconscious mind of a person than appears to introspection by his normal consciousness. He who is wise in his own interests will therefore construct a system of conduct which will generally traverse local fashion only when and in so far as he can assign a definite reason for its so doing, and principles which are anything like nation or world-wide in acceptance only after a very mature consideration and long hesitation. Chief among the principles that are something like world-wide are the following. Obedience to duly constituted authority ; sincerity, including veracity and open-mindedness , benevolence, that it is better to give than to receive, and avoidance of inflicting pain ; and conscientiousness, or the attitude which assumes that personal character MATTERS.

A PHILOSOPHY IN OUTLINE

Different natures will have their different moralities in any case owing to the frequent conflict between claims each of which may in itself be quite reasonable, but there are manifest advantages if such differences as between habitual egoists and habitual altruists—for there are some such in the world—or between habitual *blagueurs* and rigid truth-tellers, can be frankly recognized, so that there may be a sort of rough approximation between what people preach and what they practise, rather than that everybody do lip-service to a code of morality of which only a part at best is in the majority of cases taken at all seriously.

For those who cannot accept (a) above, (b) is the only rational philosophy of ethics, but the fact should not be lost sight of that it is one the practical effect of which can hardly yet be said to have been thoroughly tested in education, and its presentation so as not to invite unfortunate misunderstandings constitutes a real problem for the educationist.

IX

THE PROBLEM OF LOVE

The phenomenon of love has always been a mystery, but in former days, when it was merely one among the many inexplicable facts of physiology and psychology, the difficulty of accounting for it tended to be overlooked in the presence of the more practical question of what was to be done about it.

It is no simple or easy matter to imagine the mechanism of the erogenous effect that may result automatically from the mere perception of an individual of the opposite sex. This depends upon a wonderful arrangement by which the perception of an animal produces an act of introjection; the percipient nervous system forms an image of such kinaesthetic and coenaesthetic sensations as the animal in question appears to be experiencing. The power of introjection may be illustrated by the fact that by thinking of A, B can contort his features

A PHILOSOPHY IN OUTLINE

so as to reproduce an expression which C will recognize as that characteristic of A. It is the power of introjection that renders possible the instinct for parental care, and forms in man the basis of sympathy with suffering in other beings, but what immediately concerns the present purpose is that a congenital disposition determines that the introjective image of an individual of the opposite sex, recognized as such, shall have the effect of stimulating the generative instinct

It is inconceivable, however, that any congenital disposition should relate to a particular individual. To account for the individual reference we have to consider the peculiar characteristics of personality. A *person* is a self in relation to which my reacting dispositions have cohered or fused into an organic unity the rational basis of which lies buried in my subconscious mind, with the result that I experience impulses and compunctions relating to my behaviour towards the other self such as could never have sprung from the mere behaviour of that self considered as that of an ordinary physical

PROBLEM OF LOVE

body. In other words, I find myself estimating the *values* of actions relating to a "person" on principles different from what I should apply in the case of some mere super-Robot, and that quite apart from and consideration of consequences clearly conceived in our consciousness. I have got a habit-system of conduct in relation to the person. Even a doctor cannot think of his patient *only* in terms of physiology; he does that when he is prescribing treatment, but when the patient groans or smiles, he is reminded irresistibly that he has before him a *person*, the precise character of "personality" being not a datum of the senses or otherwise an object of articulate knowledge.

Now it is something more than a metaphor when we say that a connoisseur has "fallen in love with" an object of art, because aesthetic appreciation is simply intensive apperception and is facilitated by repetition, whence arises the tendency to irrational exclusiveness. But love is something very different from a mere attribution of superlative merit or beauty.

A PHILOSOPHY IN OUTLINE

The lover is fundamentally one who is aesthetically fascinated, not by the body only, but by the personality, of the loved one, and whose subconscious mind at the same time sees in the object of his attachment the unlimited possibility of sharing impressions, of sharing an attitude to life, of showing himself as he is, the self of his ideals and intentions, not necessarily discursively—though the subconscious mind would be uncritically optimistic concerning his potential articulateness—but somehow, provided only the two can get together ; who feels, because of the response actually given—or, in extreme cases, which it is believed could not fail to be given on the beloved's once perceiving the lover's true self—an assured certainty, of which his conscious mind is aware though its grounds lie deep in the subconscious, that in some mysterious way the two belong together, the situation being clinched by the circumstances that the direction in which love urges is also that of an oppositely-sexed being of his own species, and hence the urge coincides with the dictate of his sex instinct.

PROBLEM OF LOVE

The extents to, and the forms in, which the three factors of physical sex appetite, aesthetic fascination, and what may be called the pragmatic nexus, are respectively present in the complex entity which is love, vary of course enormously with the individual's psychological make-up. In fact, the denotation of love covers all manifestations of sexually supported emotion which are directed to a particular individual, as contrasted with, say, simple prostitution and conjugal relations in certain conditions.

Sociologically, the indulgence of love has hitherto always been a luxury. Not, indeed, that it has always been a rare thing, but it has always been haphazard, and given no place at all in the fixed arrangements of Society, all of which have had in view merely the perpetuation of the race, or the requirements of war and economic maintenance. To be happy in love was to be the very special favourite of Heaven.

In our days, like so many other luxuries, tobacco, entertainments, and motor cars, scope and opportunity for self-réalization

A PHILOSOPHY Ist OUTLINE

in love is being seriously demanded and has almost been raised to the dignity of a "necessity". Married people who have lost love are clamouring for freedom of divorce, and there is a movement for love marriages even in countries where for centuries no such thing has been dreamt of. Some persons go so far as to assert that love should be the paramount thing in life, and the writer knew personally a young man of good family, enjoying perfect health, popular, and with a fine career before him, who shot himself just because the girl he desired to marry refused him. The difficulty is that, although so long as the upbringing of children devolves on the parents, and the general arrangement of society retains its present character, the children's interests will always require that the parents remain associated until their offspring are grown up, love as a psychological condition is by no means always lasting, and in some persons who are neither abnormal nor depraved, it is on the contrary distinctly ephemeral. Those who concern themselves to stress the claims and extend

PROBLEM OF LOVE

the rights of love should bear in mind the fact of this essential conflict, and, moreover, that, even were the function of caring for the young taken out of the parents' hands, happiness in love would still be uncertain, owing to the subsidence of love rarely affecting the man and the woman simultaneously, and the relative impermanence of the associations that would be involved would tend materially to diminish the emotional exaltation obtainable in them.

THE PROBLEM OF POLITY

There are two great competing systems of polity in the world at present, an old and a new. The old is the one under which civilization has grown up. It is based on concentration in the hands of the few of power and of property. Its advantages are the promotion of self-restraint, obedience and non-covetousness—for one class, and for the other the enterprise, discovery, and all that is meant by culture. Latterly in the world's history wealth has accumulated so much that leisure for enterprise ceased to be the monopoly of a few, and enlightenment has advanced until the strict subordination of man to man can no longer be regarded as an inevitable and natural condition.

These conditions made possible the new polity, that of the principles now being experimented with in Russia. This polity makes a strong appeal to the natural disposition in man to covet power or wealth

PROBLEM OF POLITY

he sees in the possession of others, irrespective, it may be, of whether or not he has the knowledge or ability to make use of them. Furthermore, in a broad and general way it may be said that the rise in the general standard of life means that the organisation of life is more complicated, and, if the machine is to be kept working well, calls more for such constant critical watchfulness as is supposed to be applied by the democratic principle. A generation or so ago great hopes were entertained of the amelioration of society by the democratic principle, but we now understand that this principle carries with it a very great danger, rising from the highly technical nature of the problems of statecraft and the emotional character of the public mind combined with its relative inability to detect skilful imposition.

The arguments against the new polity are : (a) that it is a levelling down, whereas the traditional system professes to be working for a levelling up. (While it may be doubted whether the arithmetical disproportion between the incomes of rich and poor in the capitalist countries has

A PHILOSOPHY IN OUTLINE

tended to diminish, it is certainly true that the degree of comfort in the lives of the humble class tends, in Europe and America, to approach that of the rich; that is, the difference is less one of the ordinary standard of living than of the possession in the one case and not in the other of luxuries in the strict sense, as for example gardens, expensive jewellery, expensive entertainments, expensive sports like hunting, yachting, etc., art treasures, constant leisure and means to travel, and such like things.)

(b) That, while the destruction of the large income does not add much to the average income—it may act the other way—the moral and psychological destruction wrought is a dead loss to human culture. Communism has no morality of its own, for morality has to grow up slowly. This does not mean that modern Russia has no morality, but it means that she has to subsist chiefly on the leavings and *débris* of the old régime morality. Loyalty inside the family has its significance destroyed by the conception that it is for the state to educate the young and

PROBLEM OF POLITY

care for the aged, and that courageous independence which, accepting the cards it finds in its hands, play them uncomplainingly according to the rules of the game, facing the risk of extreme hardship sooner than be beholden to an outsider, is meaningless where every able-bodied individual is employed and looked after by the state. It will perhaps be replied that the disappearance of these virtues is not to be lamented inasmuch as they have survived their purpose, but, as I have observed elsewhere, in discarding a principle of morality much more damage is done than meets the eye.

(c) As a purely economic proposition, the communist principle has an important weakness. Capital in the modern world (that is wealth invested in tools, machinery, railways, etc., the object of which is the production of further wealth), has practically all been accumulated out of the surplus profits of industry, which, had they gone into wages, would have augmented the wages but infinitesimally and, as wages are normally all spent, that is consumed unproductively, would simply

A PHILOSOPHY IN OUTLINE

never has come into being as capital at all. Under communism, there is little incentive to enterprise, which, not having the stimulus of personal interest, does not readily thrive.

The foregoing are difficulties under which communism labours at present, not necessarily conclusive objections.

On the other side the ancient system has the damning drawback that the best conscience of to-day cannot suffer a man to feel comfortable or virtuous living in comfort and possibly luxury while he sees round him actual suffering and hardship. He knows that indiscriminate almsgiving would defeat its own purpose and impoverish himself without anything approaching a corresponding benefit to those he would like to help, and he naturally turns to an endeavour to improve the *system* of wealth distribution.

Again the capitalist and autocratic polity took its rise at a time when it was the only possible one. Now that the alternative is no longer *impossible*, we have to consider it on its merits. The experiment is in operation in Russia at

PROBLEM OF POLITY

present, but it will take many years for the test to be conclusive. Of capital importance to watch will be the effect of communism on the rising generation, though it will not be fair to judge from the products of the first experiments in communist education in the period following closely on that of the transition, if only because of the disillusionment which may be expected to follow the wave of initial enthusiasm.

No doubt in the end some compromise will be reached, some form of polity which will have the advantages of both systems without the defects of either, but that is pretty sure to be a long way ahead of us yet. In the meantime, the best line on which to work towards a solution of the problem is to endeavour to awaken in each individual a sense that any advantages he may have over his fellows in the matter of wealth, education, etc., are to be looked upon as a trust, and that, instead of merely glorying in the parade of these advantages, it is his duty humbly to endeavour to turn them to the public good, denying himself voluntarily the use

A PHILOSOPHY IN OUTLINE

of more than an ordinary man's share, except in so far as there is some specific object to be gained which is directly or indirectly in the public interest.

The above considerations relate particularly to the economic side of the question. Turning now to the political side we observe the conflict between the demand of the human individual for freedom and the demand for leadership. As has been pointed out already, it used to be hoped that this difficulty would be to a great extent solved by the development of education rendering mass criticism intelligent, but the complexity of modern life renders state policy too technical a matter to be safely entrusted to mass determination under modern conditions. On the other hand, conflict of interests, class or private, and the consequent lack of the element of consent on the part of at least a section of the governed cannot but militate against the stability of any non-democratic governing agencies.

The difficulty would be by no means hopeless of solution were all men paragons of public spirit, for then one might feel it

PROBLEM OF POLITY

possible that eventually the masses would come to trust their leaders to think for them, and conflicting interests be referred to a just tribunal. Unfortunately, such is not the case, and we are confronted on every hand with the problem of the bully.

The bully is a person, class, or nation, who is stronger than his, her, or their neighbours and is unscrupulous to boot. The bully may rely on force of arms and his victim's lack of it ; he may be unarmed but rely on force of numbers and his victim's inability to offer resistance ; he may be alone but shameless, and rely on pride or honour precluding his victim from making any effective defence ; he may lie to his neighbour's hurt knowing that the latter will not retaliate ; or he may employ superior psychological technique to turn the prejudices of men against his victim by dyslogistic publicity.

The bully is not necessarily malicious ; he may be merely a bigot. His differentia as contrasted with the decent citizen is that he employs the advantage he happens to possess to coerce others for ends of his

A PHILOSOPHY IN OUTLINE

own, instead of doing so only when acting as the instrument of an authority representing equity and the best interests of the community. Thus the soldier who fought in the Great War did not by so doing become a bully. The belligerent governments on the other hand, in endeavouring each to take the "law" into their own hand, were acting in a way generally characteristic of bullies, though, owing to the non-existence of an international authority their action was not necessarily reprehensible. Again, the majority in a voting assembly which abuses its power to injure and oppress the minority may be guilty of very grave bullying.

What remedy, what weapon, does mankind possess against the bully? None that can be relied upon as infallible in all cases. When men were all educated alike and professed to hold the same ideals, the balance of probability did lie against the bully's being a success in the long run, or at any rate against an indefinite régime of very thoroughgoing bullies. In our day, however, the cult of the superman has made it socially possible for the common

PROBLEM OF POLITY

man who is neither a genius nor a criminal of pathological stamp boldly to affect indifference to moral precepts of any description. In the same way, a nation or a class may, if once it becomes *able* to set up as a bully, be able also quite easily to maintain itself until overthrown by perhaps a stronger bully, because the bullying is in line with the selfish interest of the individuals composing it, and their very unscrupulousness is a weapon in their hands against possible rivals. Nor are the separate human beings belonging to any bully-group individually long-lived enough to be deterred by any such considerations as the object-lessons of history in the rise and fall of states. The legitimacy or desirability of bullying from the bully's point of view is not a question that concerns us here. What we have to consider is whether there is anything mankind can do to prevent the civilized community which has been so long and laboriously planned and experimented for, and of which, if it be not actually achieved in its entirety, at least the foundations have been laid and even a skeleton of the super-

A PHILOSOPHY IN OUTLINE

structure erected, to prevent this civilized community in becoming from being blasted before completion by a holocaust or bullydom. All that is clear is that in the world of the present day there are a great many people who not only realize—so do the bullies—that society is in a better way when its members are disposed to conform loyally to its rules even at the sacrifice of private satisfaction, but are themselves actually disposed to play their personal part in this way. These non-bullies are naturally the supporters of reason and justice as against war and strife.

From one point of view the persons in question should be described as pro-civilization partisans, inasmuch as what is regarded as civilization would certainly get a severe set-back in the event of another world war (notwithstanding that in the past war has been in some respects the nurse of civilization), and that the whole tendency of civilization is away from the old, crude, wasteful, and unscientific plan of settling disputes by fighting them out. In the absence of a world-policeman,

PROBLEM OF POLITY

the nations of the world are still maintaining preparedness for war, but, if the pro-civilization party are logical, they will be constantly directing diligent thought and persistent efforts to the creation and support of machinery of one sort or another that may enable international disputes to be settled by negotiation or adjudication instead of by the appeal to physical force.

The ease with which in the future bullies will be able to assert themselves and hold their own will be minimised if in the education of the young steps are taken to encourage a healthy abhorrence of bullying in any shape or form, setting this up not as a party or sectarian doctrine, but as the A B C of civilized life, and special care taken to draw attention to the various forms of non-physical bullying, social coercion, economic boycott, political intolerance, seduction and bribery, and disingenuous propaganda. For the German proverb "Wer lügt, der stiehlt" (Every liar is a thief) expresses a profound truth, namely that violation of the rule of sincerity places the perpetrator in the

A PHILOSOPHY IN OUTLINE

same moral category with the offender in a more concrete way against fundamental precepts in human relations. Wherever human wills clash, methods of force, whether of physical coercion or of deception, will always possess the character of bullying except when they are strictly defensive or genuinely disinterested (both difficult matters to be sure of), but there is this difference between the two kinds of force, that, while the former has throughout the march of history served a purpose in evolution that is salutary as far as it goes, the latter has no such claim to toleration and is entirely sinister in its traditions.

A great deal of harm is done in the world by attempts to represent this or that principle of government or legislation as ABSOLUTE. No matter how excellent may be such principles as the right to justice, the right of access to officials, freedom of speech, freedom of religious observance, no taxation without representation, or even rights of sovereignty, trouble is sure not to be far away when, instead of treating these and the like as

PROBLEM OF POLITY

principles which have such and such points in their favour, one or other of them is asserted to be sacred and inviolable on any grounds whatsoever.

XI

THE PROBLEM OF LOGIC

This is the most difficult of all, and the easiest. It is the most difficult because of the abstract and involved language in which alone it seems at present possible to state and deal with the problem, and this in turn arises from the fact that language has evolved as an instrument for the furthering of man's practical purposes, in particular for communicating his wishes as part of the process of adjusting his environment to himself, and not for purposes of philosophical speculation. Again, the problem is somewhat analogous to the use of a microscope to reveal the minute structure of the instrument itself, which could only be effected, if at all, by a highly complicated and cumbersome arrangement of reflectors, etc. It is the easiest, because it involves no data that are not well within the range of the common knowledge of ordinary persons. There is no mystery or question about

PROBLEM OF LOGIC

the facts ; the difficulty is entirely one of putting what everybody knows into words, and of not being tripped up or unwittingly deceived by devices one has oneself elaborated. In the sense in which arithmetic may be said to be independent of experiment, and in which even a revelation from Heaven could add nothing undiscoverable by man to that science, in that same sense and for the same reason those fundamental principles of logic upon which arithmetic rests and which are "all of a piece" with it are likewise an absolutely open secret requiring no special data for their effective study.

What is meant by the "meaning" of a word or symbol? A word is a system of sounds, marks on paper, etc., or a form of sensible object, which is expected to be taken by the percipient person or persons as representing or "denoting" something else, to which it need not bear any actual resemblance whatsoever. It will be readily seen that there can be grades of the possession of meaning, and a particular symbol may present different meanings, or no meaning at all, according

A PHILOSOPHY IN OUTLINE

to who the percipient is. Again, he may not be able to make his mind up as to what the meaning is, or he may be mistaken, that is to say, the word may not represent to him that which judging from his nationality and general status, the party uttering it may quite reasonably expect that it will represent to him. Some words in the language are associated with definitions which for practical purposes fix their meanings, but the majority have the indefiniteness which results from the haphazard way in which the individual generally becomes acquainted with them. Thus, we may say in general that the typical noun refers in the mind of the speaker unquestionably to things of one certain class and unquestionably not to things of a certain other class, while there remains a third class of at any rate conceivable things to which its applicability would be doubtful, but of which the existence, or at least the coming into consideration, is thought of as unlikely. (For example, for a vast number of purposes human beings may be classified into Chinese and nationals of other

PROBLEM OF LOGIC

countries, though the term "Chinese citizen" denotes a class of persons the limits of which are by no means strictly fixed and definite. Consuls and Chinese authorities occasionally holding incompatible views on the question of an individual's nationality.) For the party or parties addressed the same division into domains of applicability, non-applicability, and doubt respectively will again in general be found, and inasmuch as the utterance may be addressed to a group of individuals for each of whom the distribution of applicability will not necessarily be the same, the situation will be correspondingly complicated.

Defining a term is what we are said to do when we utter words intended to explain what its meaning is. Thus, a noun is very commonly defined by stating a class the thing denoted by it belongs to, and the property or properties that differentiate it from other members of the class. This might be called definition by connotation, and it might be contrasted with definition by denotation, which would consist in referring to various

A PHILOSOPHY IN OUTLINE

examples of the thing such as should collectively define it, the set of properties connoted by the term being the only set of properties common to all the examples adduced.

Definition by connotation is usually preferred for scientific purposes, as being briefer, requiring less mental effort to apply, and yielding a convenient touchstone for distinguishing between things to which the term is, and those to which it is not, applicable. However, it presupposes knowledge of the meanings of at least two other expressions which will be different in different cases, as well as of a third which does not necessarily vary ; these are respectively (1) the term denoting the general class, (2) that denoting the set of properties forming the differentia of the term to be defined, distinguishing it from other members of the class, and (3) the expression which indicates that the meaning of the term under definition is such as will make the statement connecting it with its class and differentia true. There is further presupposed a certain attitude of mind, not in itself

PROBLEM OF LOGIC

either a symbol or the meaning of a symbol, and which, for want of a better name, I will here call the "will to understand". In other words, if X is the term to be defined, we require to know the meaning of the expression "X is a M which is a P", that is (1) the meaning of "M", (2) the meaning of "P", (3) the meaning of "... is a ... which is a ...", (4) we require the "will to understand", that is the belief that what is presented by the words of the definition is asserted, being thus a definition and not merely a propositional function (or formula containing an undefined term, which would become a proposition were the definition of that supplied and would be true or false according to what the present unknown term proved eventually to be). Thus, were definition by connotation the only way of explaining the meaning of words, we should never be able to make a beginning since for every expression defined there must be at least three other expressions clearly understood, two of which represent concepts that are in general less particularised, and, in the

A PHILOSOPHY IN OUTLINE

normal process of human education less likely therefore to be familiar, than the term of which a definition is sought.

Definition by denotation is the type on which the great bulk of our knowledge of the meaning of terms is based. Red is defined as that which is common to fresh blood, ripe strawberries, vermilion, the sun through fog, etc. For scientific purposes this method is cumbrous and unsatisfactory on account of the large amount of "will to understand" expected from the party for whose benefit the definition is uttered, namely sufficient for the task of analysing the natures of the objects presented so as to ascertain which properties are common to them all. It is only after hearing the word used a great many times in different connections that the average child probably comes first to understand, say, what "house" means, whereas scientific purposes usually require a definition which is brief and will take effect immediately. Definition by denotation does not in itself provide any safeguard against misunderstanding or ensure that the person who utters it

PROBLEM OF LOGIC

really knows what the term in question means, but on the other hand, when care is taken and devices for verification employed, it can be relied on with almost any assignable degree of certainty. Thus, not every man who talks about straight lines knows distinctly what he means by a straight line, but it is nevertheless possible to satisfy oneself that a particular person speaking or writing in particular connections can with a 100% certainty be relied on not to use the term "straight line" amiss by reason of misapprehension. In general we can, if in doubt as to whether a man has grasped the particular group of characteristics it is intended to indicate in the process of a definition by denotation, to put him to the test of getting him to pronounce on the applicability of the term to other things, and, while in theory it would not be impossible to enumerate every conceivable member of the class of things in question, in practice the possibility of mistake is reduced to a negligibly small quantity, if at all, after consideration of quite a moderate number of examples.

Besides the "will to understand" it

A PHILOSOPHY IN OUTLINE

must be remembered that the definition by denotation also presupposes knowledge of the meaning of at least three expressions, two that indicate examples of the thing in question and a third of which one fundamental form might be “. . . . is that of which is an example”. . . . As compared with definition by connotation, however, there is this difference, that the terms presupposed are particulars used to define a general, instead of *vice versa*, and therefore belong to a class of concepts with which the individual normally becomes acquainted at an earlier stage in his education.

Now we have seen that in any definition there is presupposed knowledge of the meaning of at least three distinct expressions, and the problem is an interesting and instructive one of selecting the smallest number not less than three of expressions, each of which can be defined in terms of the others, and on these as a basis of building up a system of terms capable of expressing all ideas within the range of human thought.

I have accordingly in the Appendix to

PROBLEM OF LOGIC

this little work sketched out one form which the beginning of such a system might take. The fundamental ideas I have taken are four : Definition, Negation, Conjunction and Implication. The "will to understand" is presented by the Postulates (1) that any symbol used in one place in any particular statement has the same meaning as it has elsewhere in that statement; thus a letter of the alphabet may stand for anything whatever subject to the limitation that the meaning is constant throughout the same statement. In the following I have intended that, when once a symbol has been defined, the definition shall *ipso facto* be considered as embodied in each of the subsequent statements. (There is no logical necessity to define what constitutes a single statement as theoretically, the number of available symbols is unlimited and a symbol need never be used with any but the one meaning.) (2) That the meaning of an expression has to be guessed, the criterion of correct guessing being that there should result a complete and workable language capable of expressing with

A PHILOSOPHY IN OUTLINE

out ambiguity all thoughts that can occupy the human mind. In order to facilitate this guessing I have appended some notes in parentheses, but these of course form no logically necessary part of the system. Also, for simplicity and brevity, I have, after the initial steps, confined the use of rigorous symbolic expressions and method, to cases where they are essential, and have omitted many definitions which I have considered the reader would certainly be able, on the analogy of the others, to supply or imagine for himself.

A definition of an expression is a statement in which the expression occurs and which is true if the right interpretation be put on the expression, being either false or meaningless, otherwise. (The definitions by denotation and connotation respectively referred to above are particular cases, namely types commonly used in defining *nouns*.)

The definition or indication of referent of a word does not necessarily account completely for its *meaning*, which is the psychological effect of its perception. For

PROBLEM OF LOGIC

there may be special emphasis upon some item in the definition, or some other fact regarding the "context", that is, regarding the general class of ideas to which that belongs which the utterer proposes to express, which will modify the meaning without affecting the reference, of the term. Thus, not only can the same triangle be thought of either as equilateral or as equiangular, but "brain" and "mind" have a similar identity of referent, the referent being considered in the one case in respect of its structure, and in the other in respect of certain of its functions, "inmate" has often the same denotation as "person", which in turn denotes a human being with special regard to his or her social relations.

These varieties of terminology are merely conveniences which could be dispensed with if necessary, and in the following scheme of definitions I have placed in brackets both definitions of terms in this way unessential to the system, and, in the case of unbracketed definitions, notes as to the particular way the referents are regarded. This "regarding", however,

A PHILOSOPHY IN OUTLINE

it must be remembered, is logically dependent on the eventual definitions of symbolism, etc., in terms of world and self.

The peculiar difficulty in constructing a system of fundamental definitions is that, while one may read a statement purporting to be a definition of an expression and it may look sound enough, we not only cannot easily make clear (without using language that by its implications begs the question) *exactly* what the interpretation is that we have put on it in the statement, and consequently can with difficulty make perfectly sure that our interpretation is the *only* one that will make the statement true, but even granting that the meaning we impute to the expression under definition is the right one, we may find it difficult, owing to the highly abstract nature of the ideas concerned, to know for certain exactly what the statement as a whole means, and hence whether it is actually true in all cases. I do not therefore intend the meaning of my four fundamentals to be regarded as based *merely* on the definitions

PROBLEM OF LOGIC

given in terms of the other three fundamentals in each case. True, these constitute to the best of my present knowledge and belief a correct and adequate statement of the mutual relations of the concepts in question ; still the final arbiter must be the fact as to whether or not they *work*, and it would be humanly speaking impossible to put my system to the rigorous test of trying whether every one of the innumerable alternative definitions that are conceivable in each case would or would not eventually yield contradictions or absurdities. Ultimately based on the four fundamentals are a host of much less general concepts which are in everyday use by ordinary people in describing the world and its events to one another, and a great many of these meanings may be taken as understood 100% clearly. If, therefore, the hierarchy of concepts I have given can be shown to be logically in order, that is, free from contradictions, etc., the meaning of the fundamentals will be known to be such as are required by their places in the system, and thus to be securely determined on a

A PHILOSOPHY IN OUTLINE

firm basis of the obvious intuitions of
common-sense.

XII

THE PROBLEM OF THE OCCULT

Certain alleged phenomena, which have been disregarded throughout the foregoing pages, conflict so seriously with "normal" experience that the scientific world has usually refused to consider them as proved, notwithstanding the existence of remarkably strong and cumulative evidence for them.

Some of these phenomena, such as telepathy, clairvoyance and waterfinding, do not by absolute logical necessity compel us to assume an apparent interruption of the known natural laws affecting material bodies, but are conceivably explicable on the assumption that the nervous system has in some cases the power of registering impressions which relate to external things though not received through the channels of the senses.

A temptation is sometimes dallied with to assimilate these phenomena to such

A PHILOSOPHY IN OUTLINE

ordinary physical phenomena as may at the present state of our knowledge be unexplained but are merely so because we have not yet discovered the explanation. Superficially considered, telepathy is not more remarkable, or more inexplicable, than the action of a magnet, or a piece of amber that has been rubbed, must have seemed to the ancients, to whom both were absolutely isolated and anomalous facts. However, the impressions involved in telepathy are far more complex than can possibly be transmitted in any sort of radiation, even in the widest sense of the word, i.e. any sort of disturbance or special condition spreading uniformly through space from a centre. In wireless broadcasting an idea is never transmitted as such, but has to be translated into the form of a linear series of signs varying in one particular dimension which does admit of being transmitted, and the message has to be as it were decoded by a special mechanism at the other end. We have a conception, though we may not understand all its details, of the mechanism of ordinary

PROBLEM OF THE OCCULT

perception, and of how impulses travel from the organs of sense through the complicated structure of the brain to the organs of action. Now to effect the analysis of an impression into its elements and the rearrangement of these elements into any linear succession of varying magnitudes such as will be unambiguously recognizable as representing the same complex of elements, in the case of the idea of anything more elaborate than, say, a succession of simple things, e.g. sounds, would require the intelligent work of a separate little demon, so to speak, and certainly involve a special apparatus at least as complicated as the brain itself. However, apart from the failure of anatomy to reveal any such special organ, it is practically impossible to believe that the evolution of an organ so remarkable could have been achieved without its functioning being readily and widely observable and without its serving a definite and obvious biological purpose. The possibility may of course be suggested that the social animals depend to some extent on telepathy for

A PHILOSOPHY IN OUTLINE

the co-ordination of their activities, but it is doubtful if the phenomena cannot all in fact be otherwise accounted for, and in any case man seems too far removed from a stage in which telepathy can have played a material part in his struggle for existence for any telepathic organ, if such exist, to be more than rudimentary and no longer capable, at least in general, of functioning at all, whereas the evidence tends to show that in nearly all persons some degree of telepathic susceptibility may be found.

It is thus unlikely in the extreme that telepathy works by any sort of radiation or induction, unless we suppose that in each case the idea is transmitted in the form of a succession of sounds or quasi-sounds and acts by suggestion in cases where the original idea is of some different category, a supposition which makes the theory inapplicable to a large body of alleged phenomena that are equally well attested with those which it does explain.

Now it will be recalled that when describing the mechanism of perception

PROBLEM OF THE OCCULT

we are able only to adumbrate very roughly the principles on which the explanation of memory might be sought. The writer is acutely conscious that the mechanism there suggested seems hardly in itself adequate to serve as an explanation of all the phenomena of memory. Mechanism of the type in question would, indeed, appear essentially to yield a partial memory only, whereas, in view of the fact that memories seem never absolutely to fuse or interfere with one another, as well as on other grounds, the modern psychologist finds himself strongly tempted to believe that nothing experienced is ever really forgotten. This would mean that, either some other and more effective principle of mechanism must rule in the action of the nerves composing the brain, or that in memory we are dealing with a phenomenon incapable of being completely expressed in terms of physical causality in the ordinary sense. It is further a very tempting theory to suppose that both telepathy and insight into the future, in favour of which there is a con-

A PHILOSOPHY, IN OUTLINE

siderable amount of testimony, are phenomena in the same category with memory. That in the substance, protoplasm, that is, there resides a property of action at a distance, not only in consciousness (or the simultaneous mutual inter-action of disturbances in different places) as well as in recollection on presentiment (the inter-action of disturbances separated in time) but that inter-action may take place even over the interval of backward along one whole life or more and forward again along a genealogically related life or genealogically related lives.¹

So much for one class of phenomena. Other alleged phenomena may be said to be inorganic in their basis. To this second class belong poltergeist manifestations, materialization, apports, haunting, collective hallucinations under conditions that preclude suggestion, clairvoyance in certain cases, etc. Attempts have been made to account for these

¹ It should be noted that the expression "acting at a distance" does not imply any sort of theory; it is simply a form of words denoting an observed coherence between events in one part of the universe and events in another.

PROBLEM OF THE OCCULT

alleged happenings by attributing them to "spirits", that is, to agencies in another invisible world, but this unseen world must be thought of as having attachments to material objects such as houses and following them through space, in other words as constituting a sort of under surface to the world of matter. On this theory we must further suppose, not merely that selves comparable in intelligence to human beings can be evolved on this under surface of things without the surface itself showing any trace of the process, or, alternatively, that they should spring into existence as a sudden creation, but that when they do disturb the surface, instead of merely causing a disturbance *sui generis* there, the disturbance is in the nature of an exact facsimile of some natural object or phenomenon normally the product either of evolution or of intelligent manufacture, a performance that involves the possession on the part of the agencies concerned of an absolute knowledge of the minute details of the structure of the objects, or the nature of the processes, in question,

A PHILOSOPHY IN OUTLINE

or something, equivalent to such knowledge, together with practical omnipotence of execution within the limits of the particular manifestation.

From these fantastic efforts of supposition one is fain to have recourse to some theory that would attribute the effects under consideration to some kind of reflected image of an ordinary organism. Think of a world in two dimensions, i.e. a plane, and outside of it a concave mirror with its face parallel to the plane and at a distance equal to the radius of curvature. Any arrangement of lights situated in the plane a little away from the point perpendicularly under the mirror will then give rise to a "ghost" at the same distance on the other side of the same point. It would be convenient if we could regard the phenomena at present under discussion as depending on conditions in a continuum comprising space, time and another dimension, or other dimensions, to which the plane and mirror scheme of things bears an analogy. It might even be suggested that in some way the nervous systems of

PROBLEM OF THE OCCULT

mediums may be connected with such "reflecting" agencies. However, just as the mirror in the simple case would require nice adjustment, in order to be parallel to the plane and exactly its focal length distant from it, as well as that it should be truly spherical and the surrounding medium homogeneous, so the adjustments of the whatever-it-be that functions as the reflector must constitute yet another case of mysterious coherency in addition to those we have been considering in the preceding chapter.

Just how much in the alleged phenomena conceivably admit of explanation on any naturalistic theory it is not easy to judge, and the question is further obscured by that as to the irrefragability of the existing testimony for the extremer cases. If it be admitted that there remains a nucleus of refractory cases on record that no theory can reconcile with the rest of our knowledge concerning physical nature, then three possibilities only are open : (a) the coherence of the physical world is not perfect, but is fraught with anomalies and exceptions ; this, as

A PHILOSOPHY IN OUTLINE

we have seen elsewhere, is rationally quite possible though repugnant to the informed mind by reason of its improbability ; (b) the life in which the experience in question, i.e. the phenomenon itself or reliable indirect evidence of it, figures, is but a dream, and that there is a true world of which the world that appears to me is a travesty, even as what we know to be dreams are travesties of what we regard in relation to them as waking life ; (c) the facts cannot be genuine, and we must insist that the evidence is illusory or otherwise at fault.

APPENDIX

A definition has two functions: the indication of what features of the whole expression it is that constitute the symbol under process of definition, or definiendum, in the various forms it may assume, and the indication of the referent. The latter is much more likely to be a matter of difficulty than the former. In this Appendix no attempt has been made to achieve rigorousness in indicating the definienda of definitions, as the symbols have been mostly borrowed from mathematics, and the reader has been assumed already to possess general familiarity with their use.

E.g. the use of brackets, in accordance with the well-known mathematical practice as indicators of the 'field' of a symbol denoting a relation, as well as that of dots (generally optional) to indicate a mathematical product (in this work, a conjunction of propositions) are part and parcel of the definition of the conjunction of propositions.

A PHILOSOPHY IN OUTLINE

in the following pages brackets are also made free use of in their common sense, to indicate matter that is in the nature of explanations unessential to the argument. I have not thought it necessary to take any special steps to distinguish between the two uses of brackets here described, as the context, I believe, in every case makes enables the question to be readily decided on inspection.

$$, X_x = (\overline{X}_y = (\overline{Y}_x \overline{Y}_y = (A = A)))$$

(Or : If x (in red) be an expression occurring in connection with a proposition X_x , then the proposition is a definition of the symbol x , i.e. if there is any value, y , the substitution of which for that of x would change the proposition from a true to an untrue one, then that value is not the one which it is the object of the definition to give to x , i.e. there is some proposition, Y , which is not true of both x and y . It should be noticed that $\overline{Y}_x \overline{Y}_y$ standing by itself, i.e. without e.g. being equated to the essentially true proposition $A = A$, would have to be held to mean what it asserts "for *all* values of Y ," in which case it would obviously be a lie, since one

APPENDIX

value of Y_x might be

(Where the definiendum is not unambiguously determined by the elimination of those features of the expression which are already known, any further explanation necessary may for convenience be given in language not rigorously scientific, because, if scientific rigor were required, the definition could be repeated with variations of the symbols used until perfect freedom from ambiguity would be reached. E.g., in the above case the definiendum is not Arabic *suffix* or the use of the letter x , but the fact of the part of the proposition concerned being printed in red, and by repeating the expression with a in place of x the first two possibilities could be excluded. An alternative to the use of red would have been to prefix the word "Definition :—" to the statement.)

NEGATION.

$$\overline{(A = \overline{A})} \overline{(B = B)} \overline{(\overline{CC})}.$$

(A proposition and its contradictory cannot have the same truth-value, a proposition is the contradiction of its

A PHILOSOPHY IN OUTLINE

contradictory, and a proposition cannot be true at the same time as its contradictory.)

IMPLICATION of a proposition by another.

$$(AB \supset B) \quad \overline{(CD)} \quad (C \supset D).$$

(The conjunction of a plurality of propositions implies each of them and a proposition cannot be true at the same time that a proposition implied by it is untrue.)

($A = B$) is simply an abbreviation for $(A \supset B) (B \supset A)$; $(A \subset B) = (B \supset A)$; $(A + B) = \overline{(A \cdot B \cdot A \cdot B)}$, i.e., either A or B is true means that A and B are neither both true nor both untrue; $(A + B) = (B + A)$.

(A proposition deducible from another is implied by it, but the converse is not necessarily true.)

($A = B$ should strictly be read "A has the same truth-value as B". Where $A = B$ absolutely, i.e., for *all* values of A and B (as in the present case), then $A = B$ must mean "A" and "B" are merely alternative ways of expressing the same thought, e.g., John is James's father

= James is a son of John's. It is possible, however, in particular cases to fix the values of A and B so that they may both be true or both be false though without their being identical in meaning.)

CONJUNCTION of a plurality of propositions

$$\overline{(A.B = A.B)} . \overline{(C.C)} . \overline{(E.F)} = \\ \overline{(E.F + E.F + E.\overline{F})} . (G.H = H.G).$$

(A proposition and its contradictory cannot both be true, nor can they when conjoined with the same third proposition yield compounds of the same truth-value; the contradictory of a conjunction of contradictories is the disjunction of all the other possible combinations of the original contradictories and the affirmations of which they are the contradictories.)

(The concept PROPOSITION is, or should be, jointly defined by the definitions of the implication, negation, and conjunction of propositions. They and the system based on them possess coherence only if "proposition" has the particular meaning intended, that of something *asserted*, and possessing a truth-value (i.e., being either

A PHILOSOPHY IN OUTLINE

true' or untrue), that something being denoted by a capital letter of the English alphabet, with or without suffix or suffixes, or by a specific statement of relation, whether of conjunction, implication or any combination of these, affirmative or negative.)

THING—IDENTITY. (See also under CLASS.)

$$(a = b) = ({}_aX = {}_bX).$$

(That a is identical with b means that any proposition true of the one is also true of the other.)

$$(\textcircled{A} = \textcircled{B}) = (X_A = X_B)$$

(The sign " = " is used for identity of things as well as for equality in truth-value of propositions, but the distinction in meaning should be carefully noted. The sign can never significantly come between a thing and a proposition.)

Where, as in the present case, X may have any value, then $(X_A = X_B) \supset (\textcircled{X_A} = \textcircled{X_B})$, and accordingly the second expression in the above definition of Thing-Identity may be read: THAT SOMETHING IS SO *means* THAT SOMETHING ELSE IS SO means that ANYTHING ABOUT THE FIRST

APPENDIX

ASSERTION *would be true or untrue according as THE SAME THING ABOUT THE SECOND ASSERTION is true or untrue.*)

(A thing as I have defined it, is not necessarily the referent of a noun, though it is always such a unit of meaning as *can* be denoted by a noun. For is it always possible to alter the form of a sentence so that any part of it which has independent significance has the grammatical properties of a noun.)

CLASS, CHARACTERISTIC, etc.

(a is a (member of the class) b) = $(C_b \supset C_a)$.

(a is a \bar{b}) $\subset (C_a \cdot \bar{C}_b (P = P) \supset C_a)$.

(That a is not identical with b, or that a is a non-b, means that there is some proposition which is true of a but not of b.).

(${}_oA$ is a characteristic of (the class) b) = $({}_c\bar{A} \supset (c \text{ is a } \bar{b}))$.

(E.g.: b = a Chinese; ${}_oA$ = that his skin is yellow.)

${}_aB = (a \text{ is a } \left(\frac{1}{{}_oB} \right))$; ${}_aB = ({}_oB)$ is a property of a).

$({}_o, {}_o', {}_o'', \dots B)$ is a property of

A PHILOSOPHY IN OUTLINE

$a, b, c, \dots) = (a, b, c, \dots \text{ are arguments of (the property) } (o, o', o'', \dots B)).$

$(a \text{ is a thing}) = ({}_aX = {}_a\bar{X}) ((P = P) = {}_aX))$.

(A thing is that *concerning which* some significant proposition can be asserted.)

$A \supset (A \text{ is a notion}).$

(A notion is the thing that is asserted in a proposition.)

RELATION.

$ab \dots Rcd \dots$ is the notion that a, b, \dots stand in the relation $o, o', \dots R_o', o'', \dots$ to one another. (The existence of a relation between a plurality of things is a property of each of them.)

SYSTEM.

$(a \dots Sb \dots) = (a, b, \dots \text{ are members of the system } \frac{a, b, \dots}{o_a \dots So_b \dots})$

GROUP.

$(a_1, a_2, \dots \text{ are members of the group } a_1 + a_2 + \dots, (\text{or } \sum a)) =$

$$\left(\frac{\sum a = a_1, a_2, \dots}{\left(a_1 = \frac{1}{(o=a_1) + (o=a_2 - \dots)} \right) (a_2 = \dots)} \right)$$

APPENDIX

PLACE.

$((o, o' \dots B) \text{ is a property of } a, b, \dots)$
 $= ((\frac{o}{o, o', \dots B}, \frac{o'}{o, o', \dots B}, \dots \text{ are}$
 places in (the system-function $(\frac{o, o', \dots}{o, o', \dots B}))$.

(What are known in arithmetic as abstract numbers belong to the logical category of places as defined here.)

TRUTH.

$({}_aB = (P = P)) = (({}_aB) \text{ is a truth about } a).$

NATURE.

$((\text{the nature of } a) = \sum r) = ((p \text{ is a}$
 member of the group $\sum r) = (p \text{ is a}$

$$(\frac{1}{(o = ({}_aX = \bar{a}X) {}_aX)}).$$

(That is, the nature of a is the aggregate, or group, of all the truths to which a is relevant.)

DETERMINATION.

$((a \text{ is determined by } b) = (\text{the nature of}$
 $a \text{ is implied by that of } b)) = (b \text{ det } a).$

A PHILOSOPHY IN OUTLINE

INTRINSIC.

(the intrinsic nature of a) = $\sum s$) \subset
 ((p is not a m'r of $g'p \sum s$)
 ($\sum r$ = (nature of a)) =

p is a $\left((o =_a X) ({}_a X = (A = A) ({}_a \overline{X} = \overline{{}_a X}) \{ (\sum_{det} b) \supset ({}_a X \supset_b Z) \} \right)$

(That is, the intrinsic nature of a is the aggregate of all truths about a which imply nothing about anything about which anything is determined by the nature of a .)

OBJECTIVE-SUBJECTIVE.

A relation is subjective or objective according as its nature is or is not completely determined by the aggregate of the intrinsic natures of the things related.

IDLER.

(${}_o R_o$ is an idle $(-)$ r(elation)) \subset
 $\{ (({}_a R'_b) = ({}_x X_{a,b})) (({}_a R_b) = ({}_o X_{a,b})) \}$.

NUMBER.

(the number of (the group) $\sum a$
 = the number of $\sum b$)
 = ((x is a member of a) ($y \dots b$)
 (${}_o R_o$ is an idler)
 $({}_m R_n \supset (({}_m \overline{R}_n) \overline{({}_m R_n)} ({}_n \overline{R}_m))) \supset {}_x R_y$).
 (That is, two groups are of equal number

APPENDIX

if there is a non-reversible one-one idler between each member of the one group and some member of the other group.)

ADDITION.

(The number of $\sum a$ plus the number of $\sum b =$ the number of $\sum c = (((x \text{ is a m'r of } a) + (x \text{ is a m'r of } b)) (y \dots c) (\circ R_o' \text{ is a non-rev., 1-1, idler})) = {}_x R_y$)

MULTIPLICATION.

(the number of $\sum a$ multiplied by $\dots \sum b = \dots \sum c = (((x \text{ is a m'r of g'p } \sum c) (p \dots \sum a) (q \dots \sum b) ((\circ_m P'_n) = (\circ_n P'_m) (\circ_t P'_r \supset \circ_t P_r) (y \text{ is a } (\circ_p P_q) (\circ_o R_o) \text{ is a non-rev., 1-1, idler})) = {}_x R_y$).

CARDINALS.

Let the number of the group $\sum a = x$, $\dots \sum b = y$, etc., and let $(x \text{ multiplied by } y = z) = (x = z/y)$, etc.¹

Since the expression given above under MULTIPLICATION is symmetrical with reference to a and b , therefore x multiplied by y

¹ There is likely to be no confusion between this and the use of the same symbol in " a is a \circ_B ", since when the horizontal line has the meaning "which possesses the property" specified below it, the expression below the line is always that for a property, and contains a cypher.

A PHILOSOPHY IN OUTLINE

= y multiplied by x, which can be written
 $xy = yx$, or $x/x = y/y = 1$

But if $xy = z$ and $z = y$;

then $y/y = x = 1$;

therefore 1 is a number.

((the number x plus the number x) =
 the number y) = ((x = 1) = (y = 2)),
 and so on with the other cardinals.

PART.

((a_1X) (a_2X) . . . = ($\sum aX$) = ($a_1, a_2 . . .$
 are parts of (the whole or aggregate)
 ($a_1 + a_2 + . . .$) in respect of the property
 (aX).

(E.g. ((x is a number) (y is . . .) . . .)
 = x + y + . . . is a number), hence,
for numbers, the sign “+” has the
 meaning “plus”. In other cases, save
 where the contrary can be proved, it must
 only be read “and” or “taken together
 with”, etc.) (The condition of whole
 and parts will obtain if, say, $X =$ “is
 situated in Europe”, but not if $X =$
 “is 10 feet long”.)

MONAD.

((a is a notion) (b is a part of a)
(c is a part of a) (b=c)) \supset (a is a monad).

APPENDIX

(or: a monad is a non-notional thing which has no parts.)

Ultimate qualities are intrinsic properties of monads.

Prime relations are objective relations between monads.

A concrete thing is a system of monads (which includes the case of a single monad), or of systems the ultimate units of which are monads.

An abstract thing is one which is not concrete, i.e., which is either a place or a notion.

(An argument may be either abstract or concrete, and a system may be composed of both abstract and concrete members.)

SPACE.

A uniform one-dimensional series is a system in which each member, a_n , stands to another member, $a_{(n+1)}$ (its successor) in relation R such that

$$(((pR_q) \supset ((\bar{q}\bar{R}'_p)(\bar{p}\bar{R}'_q)(\bar{p}\bar{R}'_q))) (\bar{m}R'_1 \supset \bar{m}R_1) \supset (\bar{a}_n R_{a_{(n+1)}}).$$

A uniform two-dimensional series is a uniform one-dimensional series of uniform

A PHILOSOPHY IN OUTLINE

one-dimensional series such that one u. one-d.s. can be formed by taking one member from each of the several series, another by taking the successors of these members, each in its own series, and so on.

An n -dimensional space is a uniform n -dimensional series of places, based on the relation $(\circ R_{\circ})'$, where $(\circ R_{\circ})'$ is a non-rev. 1-1, idler, and in which the number of places of the type on which the series is based is considered greater than any assignable number, distances in directions other than that of the fundamental series being reckoned as described on page 18.

(For simplicity, only Newtonian conceptions of space-time are here considered, though of course the definitions could easily be modified to apply to the more complicated space-time conception given by the theory of relativity.)

A causal order is an n -dim. series, based on a non-reversible one-one relation, of monads having different intrinsic natures, in which the distribution of the several kinds of monads in the $(n-1)$ -dim. series composing it follows the law that

APPENDIX

(a) the variations are continuous, i.e., the differences between any member of the series and any other member can be made smaller than any assignable amount by selecting the second sufficiently near the first, (b) the distribution in any one member series (or instant-world) is determined by, and only by, the compound p , where $p = ((\text{the distribution in another instant-world}) + (\text{the intervening distance (or time-interval)})$.

A continuing body is a part of a causal order all parts of which have some intrinsic property not possessed by other parts of the causal order, the distances between any pair of the parts belonging to the same instant-world being infinitely small compared with the total extent of the instant-world, though infinitely great compared with the distances between the individual monads composing the causal order.

(Since the object of this paper is to show how the complex thought of ordinary science, and eventually of common life, can be derived from the simple thought of philosophy, I have not deemed it

A PHILOSOPHY IN OUTLINE

necessary to go beyond the world as it has until just the other day appeared to the mind of the scientist. The world required by the modern quantum theory differs of course fundamentally in its minute texture from that considered above.)

CATEGORIES.

Things can now be classified as follows :

SYSTEMS (Including as special cases *Groups and Classes*, *Monads* being a special case of a Class.)

ARGUMENTS (E.g. An obstacle; the reason why . . . ; the incumbent of . . .)

PLACES (E.g. The top; a hole; the number seven.)

NOTIONS (Of three kinds) :

Logical (Relations between propositions, e.g., that $A = B$).

Properties :—

Ultimate Qualities (In case of Monads).

Categories (that o is a $\left(\frac{1}{oA}\right)$).

Constitutions :—

Compositions

(that $o = (a + b + . . .)$).

APPENDIX

Structures

$$(\text{that } \rho = \left(\frac{a, b, X \dots}{O_a, O_b, \dots S} \right))$$

Relations :—

Subjective (E.g., that $\overset{\bullet}{p}$ is greater than q ; that r is unlike s).

Objective :—

Prime (Relations between Monads. E.g., that u is in juxtaposition with v).

Secondary (E.g., that a is inside b ; that c and d are connected by a chain).

XIII

SOME FURTHER DEFINITIONS

The state of a body^c at a given instant is the nature of the section of it belonging to that instant. Changes are differences in the states of bodies at different instants. A process is a continuing series of states, not necessarily of the same body, but constituting a thing. An event is a process at a particular place in time (not necessarily an instant). The behaviour of a body is the aggregate of its changes.

A system of things are arranged in a coherent pattern when there is some proposition, relating to their arrangement, the rule of conformation, which is such that from the assumption of the truth of this proposition, together with the nature of some part or parts of the system, the nature of the remainder of the system can be partially or completely inferred. The nature of the remaining part of the system may then be said to be constructively implied by that or those of the part or

SOME FURTHER DEFINITIONS

parts which are known at the outset. A relatively simple pattern is one in which a relatively small number of members of the system constructively determine the nature of the whole to a relatively complete extent. The opposite of a simple pattern is an abstruse one.

A system has coherence corresponding to the degree in which its arrangement approaches the condition of presenting a coherent pattern. (Coherence may be real or apparent, e.g. the number 142857 has perfect real, but to most people no apparent, coherence; on the other hand the surface of a pea has probably a coherence much greater in appearance than in reality. A good critic is a person with, possibly *inter alia*, a well-developed ability to distinguish real from apparent coherence in the particular field with which he is concerned. We shall hereinafter discuss apparent coherence only.) A system may have various orders of coherence relating to patterns under different rules of conformation. (For example, a number of approximately circular figures might be arranged in the

A PHILOSOPHY IN OUTLINE

form of an approximate circle; they might be *nearly* perfect circles, or they might be arranged in a *nearly* perfect circle.) In general, however, one or more of these will predominate, either from being approached to more closely, or from its or their relative simplicity, a moderate deviation from the pattern affecting the apparent coherence more in the case of an abstruse pattern than with a simple one. A numerical coefficient of coherence would express, as between systems whose members belong to the same general category (e.g. parts of the same causal order), the relative probability of some characteristic function of the pattern under the predominating rule of conformation (or the average, with due weighting for degrees of predominance, where a plurality predominate) being satisfied, the function which is taken as the criterion being selected with a view to its being satisfied by as nearly as possible all completely coherent patterns which might come into consideration, and as far as possible by no patterns that are entirely non-coherent, there

SOME FURTHER DEFINITIONS

being in other cases a probability of its being satisfied increasing with the approach to perfect coherency under as large as possible a range of predominating rules of conformation.

The forward direction in time in a causal order is the direction, if any, in which the apparent coherence in general decreases.

The stability of a body relative to a given environment (or type of position in the causal order) is that which is greater, or less according as the average expectation of duration, in the forward direction in time, in an environment of the given type, of any example of the class of thing to which the body belongs is greater or less. An organism is a body which has greater stability than any other of which any part of it forms a part (a characteristic possessed in particularly high degree by organisms possessing the property of life (the term "life" being one of which in the present state of knowledge no connotative definition can be given) found in the causal order known as the world of human experience).

A PHILOSOPHY IN OUTLINE

A self is an organism of which the behaviour is organised, that is, the various possible environments are grouped into a smaller number of types, stimuli, each of which determines behaviour belonging to a particular type, the response. The properties of the self that determine what response shall be made to a particular stimulus are perceptive dispositions, and their aggregate is the self's character.

The aggregate of responses is, with reference to changes produced in the environment, conduct, and with reference to changes produced in the character of the self, experience. A self knows those properties of the causal order which are determined by its character.

The immediate environment at any given moment (space of time, not an instant, too short for complete change from operation of one perceptive disposition to that of another) is the aggregate of those changes in the causal order at that moment which, together with the self's character, determine its behaviour. The time series of these immediate environments is the presentation continuum,

SOME FURTHER DEFINITIONS

and any part of it regarded as constituting a complete thing, is a presentation.

An idea is a system of perceptive dispositions relating to a thing, the object of the idea. Into its composition enters all the knowledge possessed by the self concerning the same thing. That part of the presentation continuum which determines a response belonging to the system which is the idea of a particular thing is an appearance of the thing, the response itself being a perception of the same thing, which is also the object perceived. (The "object" of an idea, and the "object" of perception, must be carefully distinguished from a physical object, which latter is a part of the particular causal order which is the physical world.) The thing to which there corresponds an idea is a concept, and where a plurality of concepts form parts of another concept the ideas corresponding to them are associated

The meaning of a perceived object for a particular self is the aggregate of the knowledge which the self acquires by perceiving it. A perception is veridical

A PHILOSOPHY IN OUTLINE

or idle according as the presentation to which it is a response is or is not determined by the presence of a thing of the kind which is the object of the idea under the operation of which the response is made. An image is an idle perception determined by the association of ideas. (See p. 42.) Ideation is the activity of the self in producing images.

Apperception is such perception as adds to the self's knowledge that of properties of the object perceived. Intuition is the knowledge of the percept due to its perception only, as contrasted with that due to ideation or past experience. Sensation is the relation of the self to the smallest distinguishable parts of the presentation regarded as an item of experience. A free idea is one the object of which can be imaged independently of the self's environment at the time.

A symbol is a thing the idea of which is associated with that of a concept (its referent) which it denotes, for the purpose of facilitating ideational apperception, there being a non-reversible one-one idler

SOME FURTHER DEFINITIONS

between each of a plurality of members of a system on which the referent is a member and the symbols which respectively denote them. (The relation symbol-referent being an idle one, its nature is in no way determined by any characteristics peculiar to the particular self-which it is that actually forms the bridge from one to the other. In respect of their physical nature, the symbol and referent may of course have very distinct and obvious relations, such as resemblance or causation, but these are what not make the thing a symbol. For it to be a symbol what matters is merely *that* it is recognized by the self as denoting such and such a referent; *how it comes* to be recognized is a question of psychology which does not concern us here. In other words, what makes a symbol is the subjective relation of similarity or parallelism in which the system of its relations with other symbols stands to that of the relations between its referent and their referents, and not to the objective relations in which either it or its referent stand to the self.)

A PHILOSOPHY IN OUTLINE

A term is the symbol for a thing, whose characteristics it connects. If a and b are terms, then the expression " a is a b " is a symbol whose referent is the notion " a is a b ". A symbol whose referent is a notion is a sentence. q stands for a predicate where pq stands for a notion and p for a thing. p stands for a subject where pq stands for a notion and q for a predicate. The perception (or, for most purposes, apperception) of a notion is a judgment or proposition (the former when considered as an act, or item of behaviour, the latter when considered as a thing apart from the self).

A belief is the perceptive disposition under which a judgment is made.

A judgment is correct or erroneous, and a proposition true or untrue, according as the perception is a veridical or an idle one. A proposition judged to be implied by another is said to be inferred from it. A valid inference is one that is a correct judgment. That one proposition is implied by another is the same as saying that the notion that the first is true is implied in that that the second is true.

SOME FURTHER DEFINITIONS

An argument is the inference of the notion that a proposition (the conclusion) is true from the notion that a certain group of propositions (premises) are all true, the conclusion following from the premises. A statement is the act of asserting proposition (or passing a judgment) or system of propositions, i.e., of performing such acts as may cause the corresponding notion or notion-system to be perceived by another self. A syllogism is the statement of an argument with two premises neither of which by itself implies the conclusion. The definition of a symbol is a statement which determines its referent.

A thing is correctly judged real which stands in an objective relation to the judging self. (It will be noted that the expression "a real thing" is, strictly speaking, meaningless, since the definition of the symbol-referent relation does not specify any particular self as the judging one. However, like negative numbers in mathematics, "real" has a genuine sphere of usefulness, which arises from the finiteness of the range of human purposes. In "Hand me that handspike, Bill", the

A PHILOSOPHY IN OUTLINE

speaker for all he knows may have a double in some other planet, who may also at the same moment be asking for a handspike, etc., etc. But, though the words used by both admit equally of reference to either Bill and either handspike, the ambiguity is not such as can cause actual trouble. Nevertheless, ambiguity there is, for the two handspikes, though alike in all there properties known to either Bill, and even in all their intrinsic properties as well, may actually differ from each other in respect of their relations with objects situated outside Bill's range of knowledge. This ambiguity could only be escaped by the theoretically conceivable, though in practice unthinkable, expedient of enumerating the properties by which the speaker, Bill, and the handspike, are distinguishable from any combination of two men and a handspike in the universe.)

A personal symbol is one that has a real thing for its referent.

Accidental properties of a thing are such as determine its reality. A certain example of a thing is one the accidental properties of which are known to the self.